





Charles Barclay.



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GENERAL ZOOLOGY

or

SYSTEMATIC NATURAL HISTORY

by

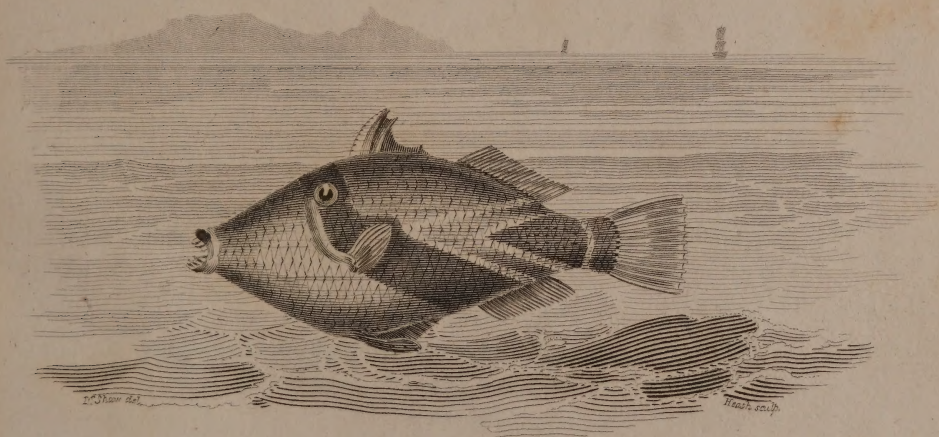
GEORGE SHAW, M.D. F.R.S. &c

WITH PLATES

from the first Authorities and most select specimens

Engraved principally by

M^r HEATH.

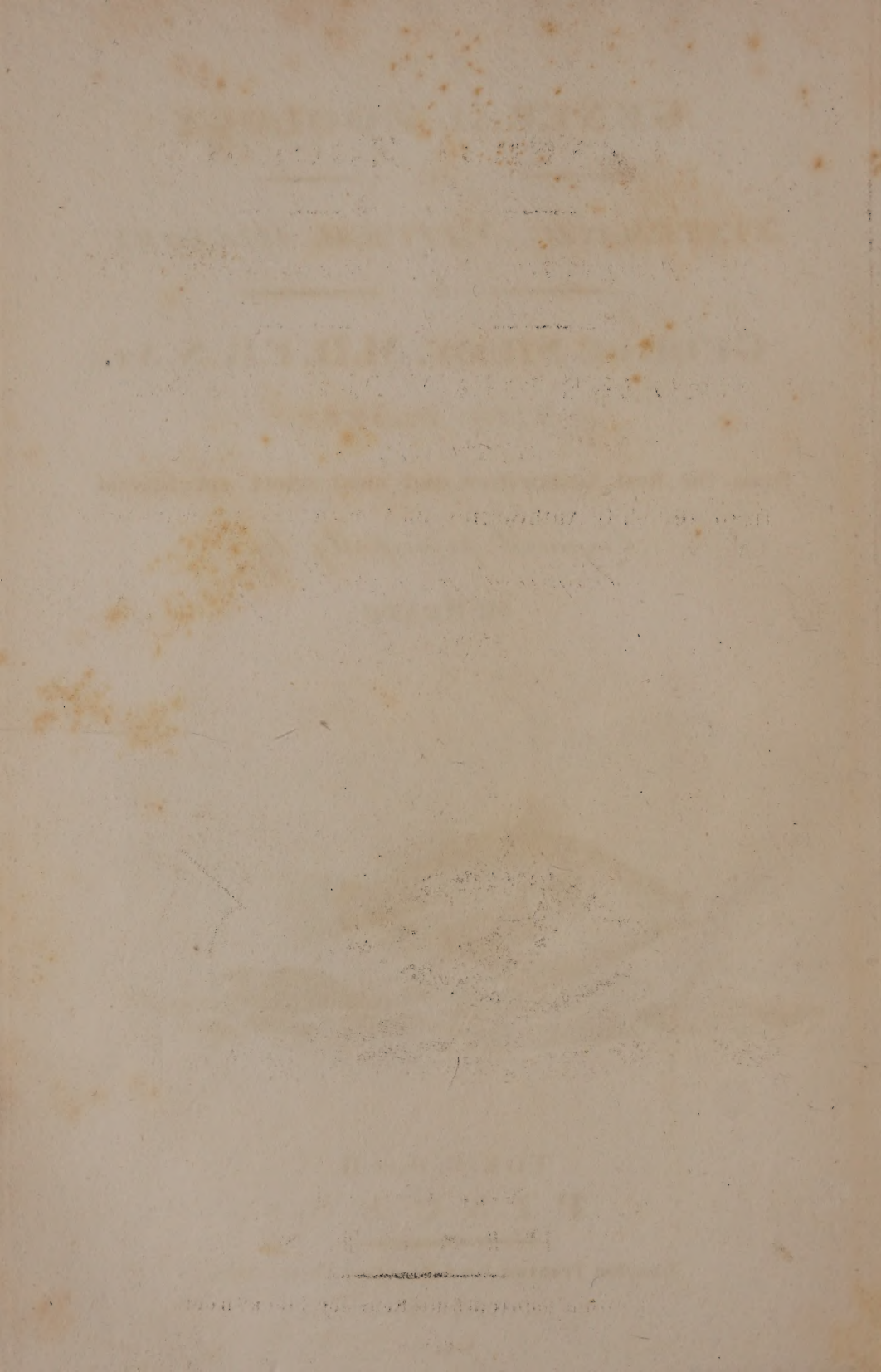


VOL. V. Part II.

P I S C E S.

London Printed for G. Kearsley Fleet Street.

1804.



GENERAL ZOOLOGY.

VOLUME V.—PART II.

PISCES.

LONDON.

PRINTED FOR GEORGE KEARSLEY, FLEET-STREET;

BY THOMAS DAVISON, WHITE-FRIARS.

1804.



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OF

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ERRATA.—VOL. V. PART II.

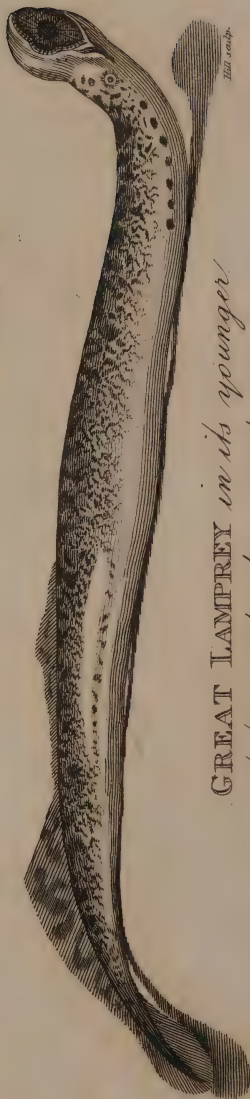
P. 291, in the specific character of the Demon Ray, for *dilata* read *dilatata*.

N.B. In Vol. 4, at p. 569, in the generic character of BODIANUS, for *serrata* read *non serrata*, and for *serrated* read *unserrated*.

GREAT LAMPREY.



Mouth



GREAT LAMPREY in its younger state, with the mouth open.

FISHES.

ORDER

CARTILAGINEI.

PETROMYZON. LAMPREY.

Generic Character.

<i>Corpus anguilliforme.</i>	<i>Body</i> Eel-shaped.
<i>Os</i> subtus, dentibus numerosis circulatim dispositis.	<i>Mouth</i> beneath, with numerous teeth in circular rows.
<i>Spiracula</i> utrinque septem ad latera colli.	<i>Spiracles</i> seven on each side the neck.

GREAT LAMPREY.

Petromyzon Marinus. *P. olivaceus, albido fuscoque varius, pinnis subaurantiis, cauda subcærulea.*

Olive Lamprey with brown and whitish variegations, somewhat orange-coloured fins, and blueish tail.

Petromyzon marinus. *P. ore intus papilloso, pinna dorsali posteriore a cauda distincta. Lin. Syst. Nat. p. 394.*

Petromyzon maculosus, ordinibus dentium circiter viginti. *Art. gen. 64. Syn. 90.*

Petromyzon ordinibus dentium acutorum plurimis. *Bloch. t. 77.*

Sea Lamprey. *Penn. Brit. Zool.*

IN its general appearance this fish makes a near approach to the Eel tribe, and particularly to the

Murænæ : it arrives at a considerable size, and to the length of more than three feet : the generality of the British specimens however are of inferior magnitude : the usual colour of the Lamprey is a dull brownish olive, clouded with yellowish white variegations : the back, as in most fishes, is darker than the other parts, and the abdomen paler : the fins are tinged with dull orange, and the tail with blue : the eyes are rather small : the mouth large, oval, situated beneath, deeply concave, and lined or paved as it were with several circular rows of sharp, triangular orange-coloured teeth : the tongue, which is short and crescent-shaped, is also furnished with a row of very small teeth round its edge : on the top of the head is a small orifice or spout-hole, through which is discharged the superfluous water taken in at the mouth and gills : near each eye are two rows of much smaller foramina, one row consisting of five, and the other of six : these are supposed to be the orifices of the glands which secrete the viscid moisture necessary for lubricating the skin : on each side the neck, commencing at a small distance beyond the eyes, is a row of seven pretty large, equidistant, round spiracles or breathing-holes, each leading to a deep sacculus lying in an oblique direction towards the head : these seven sacculi on each side are lined with a red pleated membrane, and have no communication with each other, but pass by their respective double ducts to the inside of the mouth : towards the lower part of the back commences the first dorsal fin, which is rather shallow, with a rounded outline : the second, which

commences at a very small distance from it, is nearly of the same extent, but with a subtriangular outline: the tail is short and slightly rounded.

The Lamprey is an inhabitant of the ocean, ascending rivers chiefly during the latter end of winter and the early months of spring; and after a residence of a few months in fresh water, again returns to the sea: it is viviparous, and the young are observed to be of slow growth; contrary to the assertions of some writers, who have supposed the Lamprey to be a short-lived fish. When in motion this fish is observed to swim with considerable vigour and rapidity, but it is more commonly seen attached by the mouth to some large stone or other substance, the body hanging at rest, or obeying the motion of the current: so strong is the power of adhesion exerted by this animal, that a stone of the weight of more than twelve pounds may be raised without forcing the fish to forego its hold. The general habits of the Lamprey seem pretty much to resemble those of the Eel, and it is supposed to live principally on worms and young fish. Like the Eel it is remarkably tenacious of life; the several parts, when cut in pieces, will long continue to move; and the head will strongly attach itself, for several hours, to a stone, though by far the greater part of the body be cut away from it.

Among the cartilaginous fishes none is so destitute of all appearance of real bone as the Lamprey, in which the spine itself is no other than a mere soft cartilage, without any processes or protuber-

ances whatsoever. Among other particulars in its anatomy, it is remarkable that the heart, instead of being inclosed in a soft pericardium, as in other animals, is guarded by a strong cartilaginous one: the liver, which is of an oblong form, is of a fine grass-green colour, somewhat deeper in the female fish, and may be used for the purpose of a pigment.

A vulgar error, arising from inattentive inspection, and total ignorance of the nature of the animal, is said sometimes to prevail; viz. that the Lamprey is furnished with nine eyes on each side: this mistake appears to have excited unusual indignation in Sir Thomas Brown, who in his *Pseudodoxia Epidemica* thus expresses himself on the subject:

“ Whether Lampries have nine eyes, as is received, we durst refer it unto Polyphemus himself, who had but one, to judge it. An error concerning eyes occasioned by the error of eyes; deduced from the appearance of divers cavities or holes on either side, which some call eyes that carelessly behold them; and is not only refutable by experience, but also repugnant unto reason. For besides the monstrosity they fasten unto Nature, in contriving many eyes, who hath made but two unto any animal, that is one of each side, according to the division of the brain; it were a superfluous inartificial act to place and settle so many in one plane; for the two extrems would sufficiently perform the office of sight without the help of the intermediate eyes, and behold as much as all the seven together. For the visible base of an object

would be defined by these two ; and the middle eyes, although they behold the same thing, yet could they not behold so much thereof as these ; so were it no advantage unto man to have a third eye between those two he hath already ; and the fiction of Argus seems more reasonable than this ; for though he had many eyes, yet were they placed in circumference and positions of advantage, and so are they placed in several lines in spiders. Again, these cavities which men call eyes are seated out of the head, and where the gills of other fish are placed ; containing no organs of sight, nor having any communication with the brain, and that being placed (as Galen observeth) in the upper part of the body, for the fitter situation of the eyes, and conveniency required unto sight, it is not reasonable to imagine that they are any where else, or deserve that name which are seated in other parts. And therefore we relinquish as fabulous what is delivered of *Sternopthalmi*, or men with eyes in their breast ; and when it is said by Solomon, a wise man's eyes are in his head, it is to be taken in a second sense, and affordeth no objection. True it is that the eyes of animals are seated with some difference, but in sanguineous animals in the head, and that more forward than the ear or hole of hearing. In quadrupedes, in regard of the figure of their heads, they are placed at some distance ; in latirostrous and flat-billed birds they are more laterally seated ; and therefore when they look intently they turn one eye upon the object ; and can convert their heads to see

before and behind, and to behold two opposite points at once. But at a more easy distance are they situated in man, and in the same circumference with the ear; for if one foot of the compass be placed upon the crown, a circle described thereby will intersect or pass over both ears. The error in this conceit consists in the ignorance of these cavities, and their proper use in nature; for this is a particular disposure of parts, and a peculiar conformation whereby these holes and sluices supply the defect of gills, and are assisted by the conduit in the head; for like cetaceous animals and whales, the lamprie hath a fistula, spout, or pipe at the back part of the head, whereat it spurts out the water; nor is it only singular in this formation, but also in many other."

As an article of food the Lamprey has for many ages maintained its credit as an exquisite dainty; and has uniformly made its appearance at the most splendid of our ancient entertainments. The death of King Henry the first, it is well known, is attributed to a too luxurious indulgence in this his favourite dish. It still continues to be in high esteem, and we are told by Mr. Pennant that the city of Gloucester continues to send yearly, at Christmas, a present of a rich lamprey pye to the King. It sometimes happens that the Lampries at that season are so rare that a guinea is demanded for the price of a single fish. They are most in season during March, April, and May, and are observed to be much more firm when fresh arrived from sea than when they have been a considerable

time in fresh water. They are found in several of the British rivers, but that which is most celebrated for them is the Severn. In the mouths of some of the larger European rivers they are sometimes taken in such quantities that it is impossible to use them in their fresh state; they are therefore grilled and moderately salted, and afterwards barrelled up for sale, with the addition of vinegar and spices.

LAMPERN.

Petromyzon Fluviatilis. P. subfuscus, subtus subargenteus, pinnis subviolaceis.

Brownish Lamprey, silvery beneath, with somewhat violet-coloured fins.

Petromyzon fluviatilis. P. pinna dorsali posteriori angulata. Lin. Syst. Nat. p. 394.

Petromyzon unico ordine denticulorum minimorum in limbo oris, præter inferiores majores. Art. gen. 14. syn. 89. sp. 99.

Petromyzon ordine dentium unico. Bloch. t. 78. f. 1.

Lesser Lamprey. *Penn. Brit. Zool.*

LENGTH, when full-grown, from ten to fifteen inches: on each side the mouth three* rows of very minute teeth; on the lower part seven teeth, of which the outmost on each side is the largest; and in the upper part of the mouth a large bifurcated† tooth: colour of the back brown or dusky, sometimes clouded or mixed with blue: whole under sides silvery: body marked on the upper part by numerous annular lines: on the lower part of the back a narrow fin, beyond which rises a

* Dr. Bloch considers these as a single row.

† According to Bloch two teeth.

second, which at its beginning is high and angular, and afterwards grows narrow, surrounds the extremity of the fish, forming the tail, and is continued beneath to the vent. This species is, according to Dr. Bloch, an inhabitant of the sea, and ascends in spring-time most of the European rivers, in which it is found much more frequently and plentifully than the great lamprey. With us it is found in great quantities in the Thames, the Severn, and the Dee. It is often potted with the larger lamprey, and is by some preferred to it, as being milder tasted. Mr. Pennant informs us that vast quantities are taken about Mortlake, and sold to the Dutch, as baits for their Cod and Turbot fisheries: according to this author above four hundred and fifty thousand have been sold in a season, at forty shillings per thousand, and about an hundred thousand have been occasionally sent to Harwich for the same purpose. The Dutch, it is added, have the secret of preserving them till the time of the Turbot-fishery. Great quantities, says Dr. Bloch, are taken in the March of Brandenburg, and in Pomerania, Silesia, and Prussia; and after frying, are packed in barrels by layers, between each of which is a layer of bay-leaves, and spices, sprinkled over with vinegar. In this state they are sent into many other parts of the German empire. In the river Bauster in Courland, great quantities are taken from beneath the ice with nets; they are much larger than those found elsewhere, and are packed in snow, and sent to any distance; and when put into cold water recover themselves. This

species spawns in March and April, and is a prolific fish. (It is so tenacious of life that it will live many days out of water.

PLANER'S LAMPREY.

Petromyzon Planeri. *P. pallidus, corpore annulato, oris margine papilloso.*

Pale Lamprey, with annulated body, and the edges of the mouth papillose.

Petromyzon Planeri. *P. corpore annulato, ore papilloso.* Bloch. t. 78. f. 3.

LENGTH from five or six to ten inches: general resemblance that of the Lampern: colour olive above, pale or white beneath: second dorsal fin of an angular outline: tail shaped like that of the Lamprey and Lampern; mouth furnished with small teeth: native of the rivers of Thuringia and other parts of the German Empire: like most of the genus, tenacious of life, living for the space of a quarter of an hour when immersed in spirits of wine, and moving with violence during the whole time: when thus killed in spirits, the mouth remains open, but when the fish dies in water it is shut. First observed and described by Professor Planer of Erford.

MINUTE LAMPREY.

Petromyzon Branchialis. *P. pallidus, corpore annulato, ore subtus lobato.*

Pale Lamprey, with annulated body, and mouth lobated beneath.

Petromyzon branchialis. *P. pinna posteriore lineari, labio oris posteriore latere lobato. Lin. Syst. Nat. p. 394.*

Lampetra coeca. *Will. ichth. t. g. 3. f. 11.*

Pride. *Plot Hist. Ox. p. 182. t. 10.*

Pride. *Penn. Brit. Zool.*

LENGTH from four or five to six or seven, and sometimes, though rarely, eight inches: body cylindric, somewhat tapering at each end, and marked with numerous annular lines or transverse streaks on each side, giving it somewhat of a worm-like aspect: beneath the body, from head to tail, a continued middle line: mouth toothless, and marked on each side the lower part by a kind of small lobe: fins very shallow: tail lanceolate and sharpish at the tip: inhabits the European rivers: in England more frequent in the Isis than elsewhere: instead of concealing itself under stones this species lodges itself among the mud, and is not observed to adhere to any other body like the rest of the genus: it is used as a bait for other fish: it seems to have been first distinctly described, as an English species, by Dr. Plot, in his History of Oxfordshire.

RED LAMPREY.

Petromyzon Ruber. *P. ruber, dorso subfusco.*

Red Lamprey, with brownish back.

Petromyzon ruber. *Cepede.*

GENERAL appearance that of the minute lamprey: colour red, deepest about the gills or respiratory foramina: upper parts tinged with a dusky hue: found in some parts of the Seine, where it was observed by Mons^r. Noel, who communicated it to the Count de Cepede.

 LEECH LAMPREY.

Petromyzon Sanguisuga. *P. ore amplo, dentibus minimis aurantiis, pinnis angustis.*

Lamprey with large mouth, very small orange-coloured teeth, and shallow fins.

Petromyzon Sanguisuga. *Cepede.*

GENERAL length about seven inches: habit that of the minute and red lampries: body cylindric: mouth very wide: teeth very numerous, orange-coloured, and a semicircular range of nine double teeth near the throat: both the dorsal fins shallow, the second extending nearly to the tail: eyes larger than in the minute lamprey: observed in the river Seine by Mons^r. Noel. It seems in many points so nearly to resemble the common Lamprey as to leave some suspicion of its being the young of that species: yet Mons^r. Noel seems convinced of its

being specifically different : it is said to be found only at those times in which the Shad (*Clupea Alosa*) is in the river : these fishes it persecutes, by fastening beneath their bellies, and sucking their blood with the avidity of a Leech ; its body being constantly found full of that fluid alone : they sometimes attack Salmon in a similar manner, but, from the greater thickness of the skin in those fishes, are able to obtain but a small quantity of blood from them.

SILVERY LAMPREY.

Petromyzon Argenteus. P. corpore argenteo nitido, dorso sub-flavescente.

Lamprey with bright silvery body, and slightly yellowish back.

Petromyzon corpore argenteo. Bloch. t. 415. f. 2.

LENGTH of the specimen described by Dr. Bloch about six inches : general appearance that of the minute lamprey : colour bright silvery, with a yellowish brown tinge on the upper parts : mouth large : teeth orange-coloured, and situated in the fore part of the mouth : eyes very large, with silvery irides : both the dorsal fins very shallow, and without any angular outline : lateral line very distinct : tail lanceolate. Native of the Indian seas.

LEAD-COLOURED LAMPREY.

Petromyzon Plumbeus. *P. plumbeus, subtus albo-flavescens, cauda spatuliformi.*

Lead-coloured Lamprey, yellowish-white beneath, with spatule-shaped tail.

Petromyzon Septoeil. *Cepede. 4. p. 667.*

BODY decreasing from head to tail in a conical manner: mouth large: dorsal fins rounded: tail spatule-shaped: colour of the upper part of the animal leaden-grey; of the under yellowish white: size not mentioned: observed by Mons^r. Noel in the Seine, where it is very plentiful.

BRILLIANT LAMPREY.

Petromyzon Bicolor. *P. supra niger, subtus argenteus.*

Lamprey with black back, and silvery abdomen.

Petromyzon niger. *Cepede. 4. p. 667.*

THIS species is easily distinguished by its colours, the upper part being of a fine black, and the under of a brilliant silver-colour: the mouth is very small: both the dorsal fins rounded, and each nearly as short as the caudal, which is spatule-shaped: first described by Mons^r. Noel, by whom it was communicated to the Count de Cepede: found in the Seine, and said to be sometimes taken in great plenty: size not mentioned.

GASTROBRANCHUS. GASTROBRANCHUS.

Generic Character.

<i>Corpus</i> anguilliforme.	<i>Body</i> Eel-shaped.
<i>Os</i> subtus, dentibus numerosis, pectinatis.	<i>Mouth</i> beneath, with numerous pectinate teeth.
<i>Spiracula</i> duo ventralia.	<i>Spiracles</i> two, beneath the abdomen.

BLIND GASTROBRANCHUS.

Gastrobranchus Cæcus. *G. lividus, subtus pallidior, ore cirris octo.*

Livid Gastrobranchus, paler beneath, with eight beards at the mouth.

Gastrobranchus coecus. *G. oculis carens. Bloch, t. 413.*

Myxine glutinosa. Lin. Syst. Nat. p. 1080. Müll. prodr. Z. D. p. 227. Schrift. der Berl. Gesselsh. naturf. Fr. 10. p. 193. 244. t. 4.

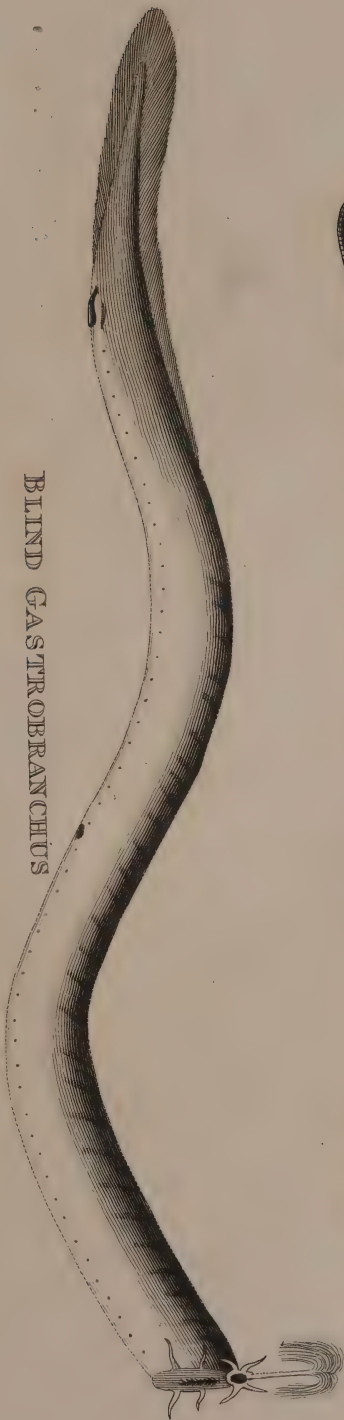
Pihraol. *Kalm. it. Amer. 1. p. 118.*

THE fish which constitutes this genus has long since been described by Linnæus and others under the title of *Myxine glutinosa*, and considered as belonging to the tribe of Vermes, in which situation it ranks in the latest editions of the *Systema Naturæ*. Dr. Bloch however, from accurate examination both of its external and internal structure, has very justly considered it as a legitimate cartilaginous Fish. The usual length of the

DOMBEKAN GASTROBRANCHUS



BLIND GASTROBRANCHUS



Will. Smith



Ventral view of thorax &c.

European specimens is from four to six inches, but in the Indian ocean it appears to arrive at a far superior size, nearly equalling in this respect the common Eel. In its general appearance it bears a near resemblance to the Lampries, with which by Kalm, its first describer, it has been associated. It is remarkable for the total want of eyes, not the least vestige of any such organs being discoverable by the most attentive examination: the mouth, which is situated beneath, as in the Lampries, is of an oblong form: on each side are two beards or cirri, and on the upper part four: in front of the top of the head is a small spout-hole, furnished with a valve, by which it can at pleasure be closed: the teeth, which are situated very deep in the mouth, and are of an orange-colour, as in the Lamprey, are disposed on each side into a double row, in form of a pectinated bone; each upper row consisting of nine and each lower row of eight teeth; and in the middle of the roof of the mouth is a single, sharp-pointed, and curved tooth: no nostrils are discoverable: the body is destitute of scales, lateral line, and every kind of fin, except that which forms the tail: this fin is shallow, and commencing at the lower part of the back, runs round the extremity of the body, and is continued beneath as far as the vent: the extremity of the body, where it is surrounded by the caudal fin, is taper or pointed: beneath the body, from head to tail, runs a double row of pretty conspicuous, equidistant pores, through which, on pressure, exsudes a viscid fluid, and at somewhat more than a third

of the animal from the head, are situated, beneath the body, the two spiracula, which consist of a pair of oval apertures. On laying open the fish, it appears that each of these apertures communicates with a series of globular red cells or vesicles, disposed, to the number of six, on each side the body: every one of these twelve cells or vesicles communicates on its exterior side, by a short branch, with the duct leading from the spiracle; and on its interior side with another duct leading into the mouth: below these cells is situated the heart, which is of a roundish or but slightly cordate shape: the liver is large, and consists of two lobes or divisions, of which the upper is smallest: the ovarium is of a lengthened form, and the ova appear to arrive at a very considerable size before they are excluded from the body, and it is doubtful whether they may not hatch internally, as in some other fishes, before exclusion. The general colour of the animal is whitish with a dusky blueish cast above, and reddish towards the head and tail: the fin surrounding the tail-part is yellowish-brown.

The manners of this fish are represented as highly singular: it is said to enter into the bodies of such fishes as it happens to find on the fishermen's hooks, and which consequently have not the power of escaping its attack, and by gnawing its way through the skin, to devour all the internal parts, leaving only the bones and the skin remaining: Another particularity in this animal consists in its uncommonly glutinous nature: if put into a large vessel of sea-water, it is said in a very short space to

render the whole so glutinous as easily to be drawn out into the form of threads: when taken out of water the Gastrobranchus is said to be incapable of living more than three or four hours. It is an inhabitant of the Northern seas, and appears also to occur in those of the Southern Hemisphere, where, as before mentioned, it arrives at a much larger size than in the northern regions*.

DOMBEYAN GASTROBRANCHUS.

Gastrobranchus Dombeyi. *G. capite tumido.*

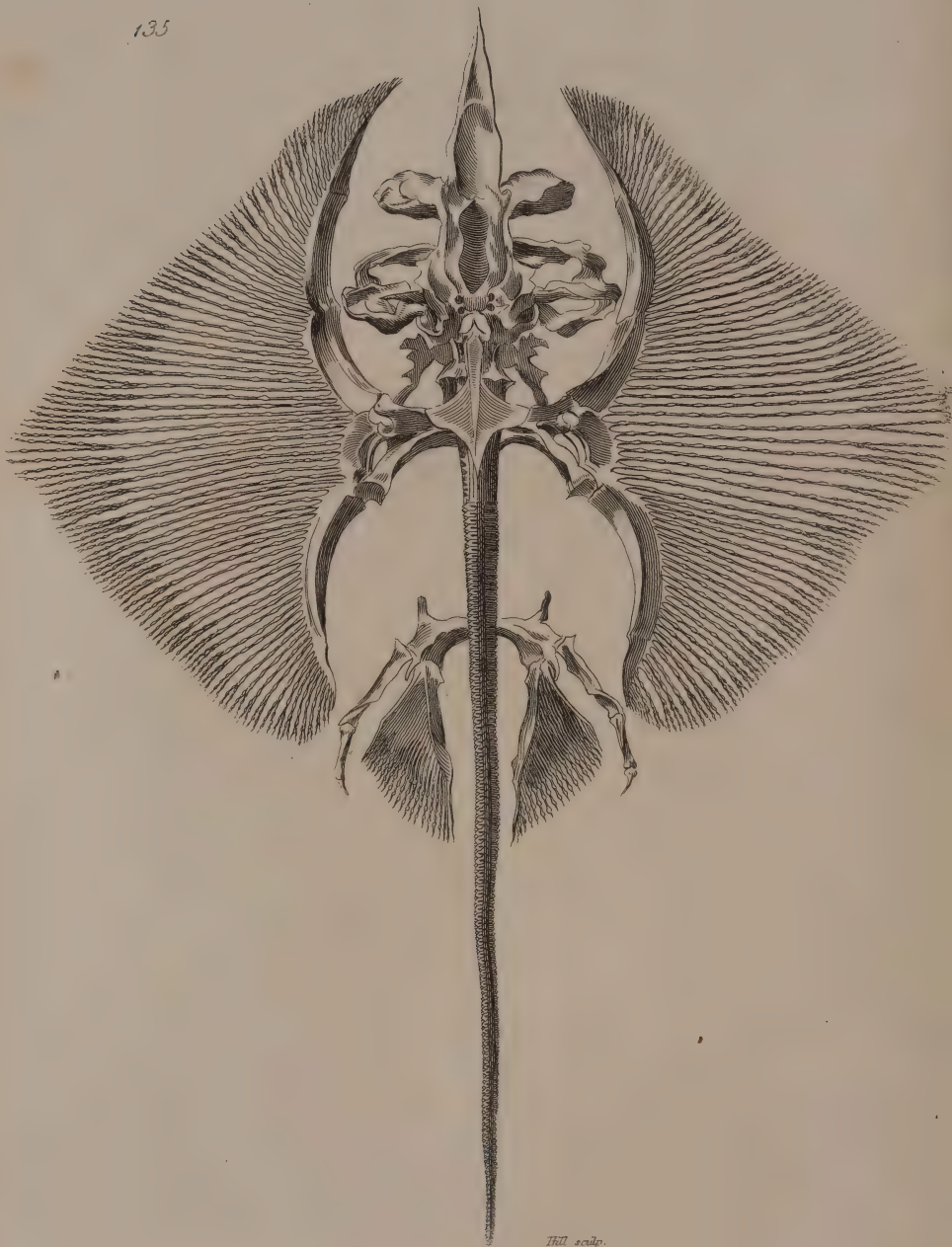
Gastrobranchus with tumid head.

Gastrobranchus Dombey. *Cepede.*

SIZE much larger than the European specimens of the Gastrobranchus cœcus: head rounded: and broader than the body: on the upper lip four beards; number of those on the lower uncertain, the specimen being described in a dried state: teeth pointed, compressed, triangular, and disposed in two circular ranges, the exterior of which is composed of twenty-two, and the interior of fourteen teeth: a single tooth longer than the rest, and of a curved form in the roof of the mouth, as in the

* This idea is grounded on a drawing by Dr. Forster, preserved, among those of several other Southern fishes, &c. in the collection of Sir Joseph Banks, and which appears to represent a gigantic specimen of the Gastrobranchus cœcus. In the British Museum is also a specimen of equal size, but not in such a state as to admit of very accurate examination. Perhaps it may be rather the Dombeyan Gastrobranchus.

European species: eyes and nostrils imperceptible: colour uncertain: tail rounded at the extremity, and terminated by a very shallow fin united with the anal. Native of the South-American seas: observed by Mons^r. Dombey, and described by Cope from the dried skin in the Paris Museum.



SKELETON OF THORNBAC.

RAJA. RAY.

Generic Character.

<i>Os</i> sub capite, transversum, dentibus obsitum.	<i>Mouth</i> situated beneath the head, transverse, beset with teeth.
<i>Spiracula</i> subtus ad collum utrinque quinque.	<i>Spiracles</i> beneath, five on each side the neck.
<i>Corpus</i> depressum, pleris- que subrhomboideum.	<i>Body</i> in most species sub- rhomboidal.

THIS genus is distinguished by the remarkable breadth and thinness of the body, the pectoral fins appearing like a continuation of the sides themselves, being covered with the common skin: their rays are cartilaginous, strait, and furnished with numerous swellings or knots: the teeth are very numerous, small, and placed in ranges over the lips or edges of the mouth: the eyes are furnished with a nictitating membrane or skin, which can at pleasure be drawn over them like an eyelid, and at some distance above the eyes are situated the nostrils, each appearing like a large and somewhat semilunar opening edged with a reticulated skin, and furnished internally with a great many laminated processes divided by a middle partition: they are guarded by an exterior valve: behind the eyes are also a pair of holes communicating with the

mouth and gills: these latter, taken together, present a vast extent of surface: the young are contained in oblong square capsules with lengthened corners, and are discharged at distant intervals, the young animal gradually liberating itself from its confinement, and adhering for some time by the umbilical vessels. The Rays in general feed on the smaller kind of crabs, testacea, marine insects, and fishes: they are constant inhabitants of the sea, lying concealed during part of the winter among the mud or sand, from which they occasionally emerge and swim to unlimited distances.

Of a rhomboid shape.

SKATE.

Raja Batis. *R. cinerea nigro-varia, subtus alba nigro-punctata, dorso glabro, cauda unico aculeorum ordine.*

Cinereous Ray, with dusky variegations, beneath white with black points, with smooth back, and a single row of spines on the tail.

Raja Batis. *R. varia, dorso medio glabro, cauda unico aculeorum ordine.* *Lin. Syst. Nat.*

Raja cauda tantum aculeata. *Bloch. t. 79.*

Skate. *Penn. Brit. Zool.*

THE Skate is one of the largest of the European Rays, sometimes weighing from one to two hundred pounds, and even, according to some accounts, not less than three: its general colour on the upper parts is a pale cinereous brown, varied with several darker or blackish undulations: the under part is



Torpedo sculp.

SKATE.

white, marked with numerous, distant, black specks: in the male the pectoral fins are beset towards their tips or edges with numerous small spines: on each side the tail, at some distance from the base, is a sharp spine: several very strong ones run down the back of the tail, and in some specimens a row of smaller ones is visible on each side. As an edible fish the Skate is considered as one of the best of its tribe, and is an established article in the European markets, being found in great plenty in the adjoining seas, where it usually frequents the shores in the manner of flat-fish: it breeds in the month of March and April, and deposits its ova from May to September. We are informed by Mr. Willughby that a Skate of two hundred pounds weight was sold in the fish-market at Cambridge to the cook of St. John's College in that university, and was found sufficient to dine the whole society, consisting of more than 120 persons. In October the Skate is usually poor and thin; begins to improve in November; and grows gradually better till May, when it is considered as in its highest perfection.

THORNBACK.

Raja Clavata. R. cinereo-flavescens, rostro subacuto, corpore aculeis sparsis clavatis, serie dorsali unica.

Yellowish-cinereous Ray, with subacute snout, scattered clavated aculei on the body, and a single row down the back.

Raja clavata. R. aculeata, dentibus tuberculis, cartilagine transversa abdominali. Lin. Syst. Nat.

Raja clavata. Rond. Gesn. Will. Raj. &c.

Thornback. Penn. Brit. Zool.

THIS species grows to a very considerable size, though rarely equal in magnitude to the Skate: in its general appearance it resembles that fish, but is somewhat broader in proportion, and is easily distinguished from the Skate by the very strong, curved spines with which its upper surface is covered: these are most conspicuous down the middle and on each side of the back, where four or six, of much larger size than the rest, are generally seen; the remaining parts being furnished with many scattered spines of smaller size, intermixed with still more minute ones, and the whole skin is of a rough or shagreen-like surface: the back is marked with an uncertain number of pale or whitish, round spots, of different sizes, and which are commonly surrounded with a blackish or dark-coloured edge: these spots are said to be caused by the shedding of the spines at different intervals: along the middle of the back runs a single row of strong spines, continued to the tip of the tail: and it often happens that there are three, or even five rows of spines on this part, as in the figure given

by Mr. Pennant in the third volume of the British Zoology: the colour of the skin is a brownish grey, with irregular blackish or dusky variegations: the under part is white, with a slight cast of flesh-colour, and about the middle of the body, as well as on the fins, are disposed several spines, similar to those on the upper side, but less strong: the cartilage dividing the upper and lower portions of the body is in this species remarkably conspicuous; but since a similar appearance exists in several other species, it cannot be of much importance in the specific character, though considered as such by Artedi and Linnæus; nor can any greater dependence be placed on that of Dr. Bloch; the Thornback varying like others of this genus, in the number and disposition of the caudal spines. The Thornback is an inhabitant of the Mediterranean and other seas, and is in some esteem as a food, though not equal to the Skate in goodness. It may be added, that much confusion and uncertainty seems to prevail as to the synonyms of this species.

ROUGH RAY.

Raja Rubus. *R. griseo-varia aspera, rostro subacuto, ordine aculeorum in dorso simplici, in cauda triplici.*

Variegated-grey, rough Ray, with subacute snout, a single row of dorsal, and a triple row of caudal spines.

Raja Rubus. *R. ordine aculeorum in dorso unico, tribusque in cauda.* Bloch, t. 84. Lin. Gmel. p. 1507.

Rough Ray. Penn. Brit. Zool.

GREATLY allied to the Thornback, but covered with more numerous spines, every part of the skin on the upper surface being muricated with sharp curved aculei of different sizes : of these one row of the largest runs down the middle of the back, and three, or, sometimes, five, along the tail: others are dispersed about the region of the eyes and the flaps of the pectoral fins: the general colour is a yellowish or whitish grey, sometimes variegated with dusky or brownish clouds and streaks: the under side is white, and beset with very numerous scattered spines, but less strong than those on the upper side: the general size of this species is the same with that of the Thornback. A specimen observed by Mr. Pennant measured nearly three feet from the nose to the tip of the tail. It is a native of the Mediterranean and other seas. The teeth in this fish are sharp-pointed; in the Thornback obtuse.

TUBERCULATED RAY.



Hill sculp.

EGLANTINE RAY.

FULLER'S RAY.

Raja Fullonica. *R. griseo-varia, dorso toto aculeato, aculeorum ordine simplici ad oculos, duplici in cauda.*

Variegated-grey Ray, with the whole back aculeated, a single row of spines at the eyes, and a double one on the tail.

Raja fullonica. *R. dorso toto aculeato, aculeorum ordine simplici ad oculos, duplici in cauda.* *Lin. Syst. Nat.*

Raja fullonica? *Rond. Gesn.*

THIS seems, from the descriptions of authors, to be very nearly allied to the *R. Rubus*, but is still more strongly roughened with spines; the back being entirely covered with those processes, but the tail furnished with only a double row: in the present genus however such is the close alliance of several species, and so great the differences which take place in specimens of a smaller or larger growth, that it is hardly possible to assign distinctive characters sufficiently accurate; and it may perhaps be doubted whether this fish be any thing more than a variety of the preceding kind.

 EGLANTINE RAY.

Raja Eglanteria. *R. dentibus obtusis, corpore aculeis minutis obsito, cauda bipinnata, spinis numerosis muricata.*

Ray with obtuse teeth, body beset with minute prickles, and bipinnate tail muricated with numerous spines.

Raja Eglanteria. *Cepede.*

THE present species is described by Cepede, who informs us that it was first observed by Citizen

Bosc, and is a native of the North American seas : its form is somewhat obtusely rhomboidal, and its upper surface is covered with very small and short spines, which are even scarce perceptible in some specimens except on the middle of the back, which is furnished with a range of much longer ones: this range is continued down the whole length of the tail, the sides of which are beset with several rows of differently-sized spines. The colour of this Ray is brownish above, and white beneath : it is said to be not uncommon in the bay of Charles-Town.

SHARP-NOSED RAY.

Raja Oxyrinchus. *R. cinerea, rostro subacuto producto, serie aculeorum dorsali caudalique simplici.*

Cinereous Ray, with subacute produced snout, and a single row of spines down the back and tail.

Raja oxyrinchus. *R. varia, dorso medio tuberculis decem aculeatis.* *Lin. Syst. Nat.*

Raja oxyrinchos major. *Will. ichth. p. 71.*

Raja aculeorum ordine unico in dorso caudaque. *Bloch. t. 80.*

Sharp-Nosed Ray. *Penn. Brit. Zool.*

SIMILAR in shape to the Skate, but with a longer and sharper snout, not ill resembling the shape of a spoutoon: colour of the whole upper part cinereous, with several pale, or whitish spots intermixed with a few slight dusky streaks or variegations: beneath white, with dusky or blueish streaks: down the back and tail runs a single row of spines, and a few others are placed about the region of the eyes: the sides of the tail are also sometimes furnished



SHARP-NOSED RAY.

with a row of smaller or weaker spines than those on the upper part: the eyes are large, as is also the mouth. This species, like the Skate, often arrives at a very considerable size, though it is, in general, of smaller dimensions than either that fish or the Thornback. It is a native of the Mediterranean and Northern seas.

NEEDLE-NOSED RAY.

Raja Acus. *R. rostro acutissimo, maculis quatuor dorsalibus nigris.*

Ray with very sharp snout, and four black dorsal spots.

Raja Acus. *Cepede.*

SIZE not mentioned: head ovate: snout extremely sharp: teeth obtuse: on the back four black spots placed in such a manner as to form a portion of a circle: a single row of spines down the tail, on the upper part of which is placed the dorsal fin: no caudal fin: native of the European seas.

MIRROR RAY.

Raja Miraletus. *R. fusco-grisea varia, supra utrinque macula magna ocellata, cauda triplici serie aculeorum.*

Grey-brown variegated Ray, marked above on each side by a large ocellate spot, with a triple row of caudal spines:

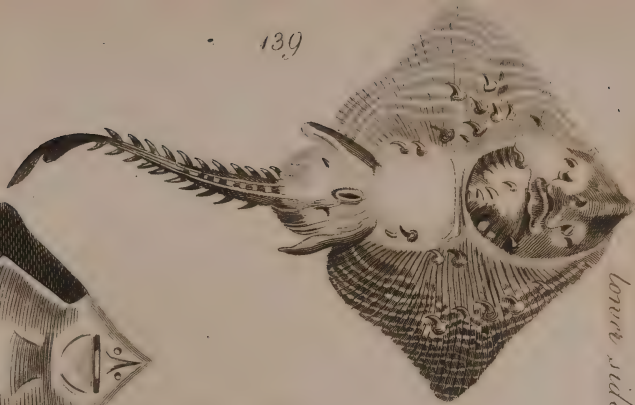
Raja Miraletus. *R. dorso ventreeque glabris, aculeis ad oculos, ternoque eorum ordine in cauda. Linn. Syst. Nat.*

Raja oculata. *Salv. Ray. Will.*

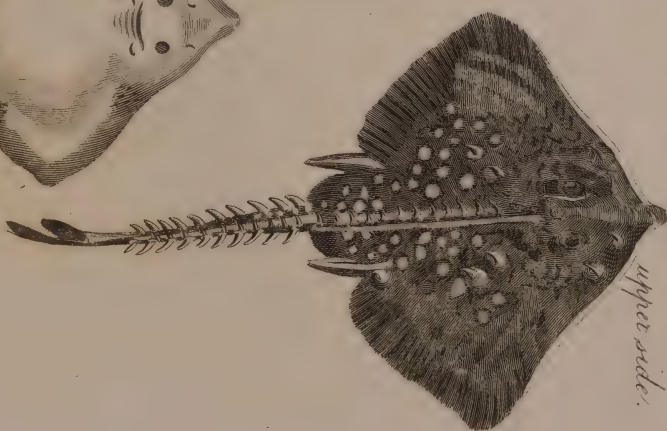
DESCRIBED by Rondeletius : general appearance similar to that of the Thornback and some others : surface comparatively smooth, being chiefly furnished with spines about the region of the eyes, and with a triple row along the tail ; but the principal distinctive character seems to consist in each of the pectoral fins being marked about the middle, or near the body, with a large, circular, eye-shaped spot, consisting of a purplish or dusky circle, with a whitish or yellowish centre * : the general colour of the upper parts is a dull brownish grey. This fish is an inhabitant of the Mediterranean.

* These spots are said to differ occasionally in colour, being sometimes purple with a blueish centre, and with the exterior circle surrounded with yellow, and at other times blackish.

THORNBACK
lower side.



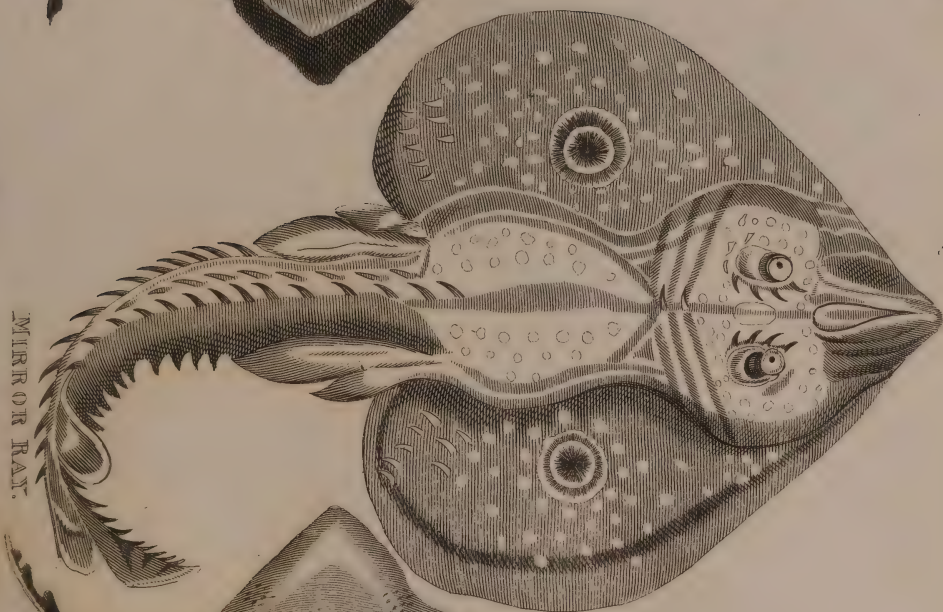
THORNBACK
upper side.



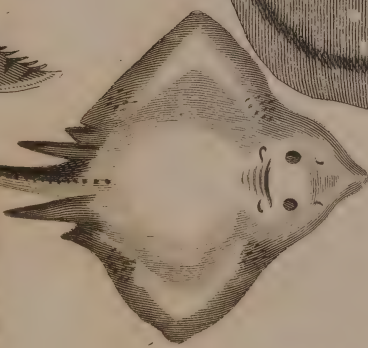
MARGINED RAY.



MIRROR RAY.



WHITE RAY.



Not complete.

UNDULATED RAY.



PAINTED RAY.



Heath sculp

BLACK RAY.

Raja Nigra. *R. nigra, subtus alba, spinarum dorsalium serie simplici, caudalium triplici.*

Ray with the body black above, white beneath, with a single row of dorsal, and a triple row of caudal spines.

Raja nigra. *Cepede.*

SHAPE rhomboid: snout pointed: from the middle of the back to the end of the tail a row of spines; and on each side the tail a row of more distant ones: tail very thin: whole fish on the upper surface black, more or less deep in different specimens: beneath quite white: native of the European seas; sometimes taken in the mouth of the Seine, among Thornbacks and other Rays: grows to a considerable size.

 PAINTED RAY.

Raja Picta. *R. flavescens, seriebus tortuosis guttarum albarum ornata.*

Yellowish Ray, marked with tortuous rows of white spots.

Raja picta. *Cepede.*

SHAPE rhomboid: snout rather produced: from the head to the end of the tail a row of spines: two or three spines before each eye; and a row of five or six on each side the beginning of the tail: colour above yellowish, with very numerous, small, round, white spots, many of which are symmetrically arranged in a double tortuous series on each

side : the most elegant of all the Rays : native of the European seas, and found occasionally about the French and English coasts.

UNDULATED RAY.

Raja Undulata. *R. grisea, strigis subtransversis undulatis nigricantibus.*

Grey Ray, with subtransverse undulated blackish streaks.

Raja undulata. *Cepede.*

SHAPE like that of the Thornback : snout somewhat pointed : from the head to the end of the tail a row of spines ; and a pair before and behind each eye : another near the head, and one on each side the dorsal series : colour pale grey-brown, with numerous undulating dusky streaks, chiefly in a transverse direction : beneath pale or whitish. Native of the European seas.

WHITE RAY.

Raja Alba. *R. supra albida, subtus nivea.*

Whitish Ray, milk-white beneath.

Raja alba. *Cepede.*

SHAPE like that of the Thornback : size moderate : colour above whitish ; beneath milk-white : body pretty thick : snout pointed : head more distinctly marked off from the breast than in most other Rays : tail of middling length, with two fins above, and one at the extremity : in the male is a single

row of spines along the tail, and a groupe at the four angles of the body : in the female three rows on the tail : native of the Mediterranean.

MARGINED RAY.

Raja Marginata. *R. testacea, subtus albida margine lato nigro.*
 Pale-ferruginous Ray, white beneath with a broad black border.
 Raja marginata. *Cepede.*

SIZE rather small : shape like that of the preceding : colour above pale bay ; beneath whitish, with a very broad black margin : on the tail three rows of spines, and behind each eye a single spine. Native of the Mediterranean.

SHAGREEN RAY.

Raja Chagrinea. *R. supra tuberculata, rostro caudaque serie aculeorum triplici.*

Ray with the body tuberculated above, and with a triple row of spines on the tail.

Shagreen Ray. *Penn. Brit. Zool.*

BODY less broad in proportion than in most others of this division : snout long and pointed, and furnished with two rows of spines : several others are placed in a semicircle towards the eyes, of which the iris is sapphire-coloured : both sides of the tail are armed with numerous smaller ones : the whole upper surface of the animal is roughened by numerous small granules like those on the skin of some of the shark-tribe, and particularly of the

Great Dog-Shark, of the skin of which is prepared the substance known by the name of shagreen: colour above cinereous brown, beneath white. Native of the European seas.

With slender tail, generally armed with a spine.

STING RAY.

Raja Pastinaca. *R. subolivacea, subtus albida, cauda tenui, apterygia, armata.*

Subolivaceous Ray, whitish beneath, with slender, finless, armed tail.

Raja Pastinaca. *R. corpore glabro, aculeo longo anterieus serrato in cauda et dorso apterygio.* *Lin. Syst. Nat.*

Raja cauda apterygia, aculeo sagittato. *Bloch, t. 82.*

Sting Ray. *Penn. Brit. Zool.*

SHAPE subrhomboidal, but somewhat approaching to ovate, the pectoral fins being less pointed than in some of this division: snout pointed: body more convex than in the preceding rays: colour of the whole animal above yellowish olive, with the back darkest, and approaching, in some specimens, to a blueish brown: beneath whitish: tail without fin, of considerable length, very thick at the base, and gradually tapering to the extremity, which is very slender: near the middle it is armed, on the upper part, with a very long, flattened, and very sharp-pointed bone or spine, finely serrated in a reversed direction on both sides: with this the animal is capable of inflicting very severe wounds on such as incautiously attempt to handle it; and it answers

the purpose both of an offensive and defensive weapon: it is annually cast, and as it frequently happens that the new spine has arrived at a considerable size before the old one has been cast, the animal is occasionally found with two, in which state it has been sometimes erroneously considered as a distinct species. This fish is said not to grow to so large a size as many others of the genus: it is an inhabitant of the Mediterranean, Atlantic, and Indian seas, and is numbered among the edible Rays. On account of the danger attending the wounds inflicted by the spine, it is usual with the fishermen to cut off the tail as soon as the fish is taken; and it is said to be illegal in France and some other countries to sell the animal with the tail still adhering. It is hardly necessary to observe that the spine is perfectly void of any venomous quality, though formerly supposed to contain a most active poison; and that the effects sometimes produced by it are entirely those arising from deep puncture and laceration, which, if taking place in a tendinous part, or among the larger nerves and blood-vessels, have often proved fatal. Oppian, Ælian, Pliny, and others have related in terms of considerable luxuriance the effects of this animal's powerful weapon: and a general description may be found in Aldrovandus: it was supposed to be not only poisonous in the living animal, but to preserve its poison when taken from the fish and affixed to the head of an arrow or a spear: it was said to wither the most flourishing plant by its touch, and even to cause trees to die, by striking the bark with its

point. It formed the head of the fatal spear presented by the enchantress Circe to her son Telegonus, by which he was rendered superior to all his enemies, and with which he at length unconsciously slew his father Ulysses.

The general habits of the animal are similar to those of the rest of the genus, often lying flat, and in ambuscade on the soft mud at the bottom of the shores which it frequents, and seizing its prey by surprise, and at other times pursuing it through the depths of the ocean.

EAGLE RAY.

Raja Aquila. *R. rhomboid-dilatata cinerea, subtus pallida, cauda tenuis, pinnata, armata.*

Rhombic-dilated cinereous Ray, pale beneath, with slender, pinnated, armed tail.

Raja Aquila. *R. corpore glabro, aculeo longo serrato in cauda pinnata.* *Lin. Syst. Nat.*

Raja cauda pinnata, aculeoque unico. *Bloch, t. 81.?*

Aquila. *Will. ichth. p. 64. t. C. 2.*

SHAPE rhomboid, but with a considerable dilatation; the pectoral fins approaching to a subfalcated form: colour cinereous above; pale or whitish beneath: head rather large: snout somewhat produced: eyes large and prominent, with yellow irides: tail long, slender, sharp-pointed, and furnished, about the middle, with a spine similar to that of the Sting Ray. This species grows to a very great size, sometimes measuring ten, twelve, or even fifteen feet in length, and weighing upwards



EAGLE RAY.



Hill sculp.

GUTTATED RAY.

of three hundred pounds. It inhabits the Mediterranean, Atlantic, and Indian seas, and is said to swim in a slower manner than most other Rays: like the rest of the genus it preys on the smaller fishes, &c. and is supposed to strike and kill, or at least disable its prey, with the caudal spine: when taken it is observed to vibrate the tail with great strength and rapidity in all directions. It is not numbered among edible fishes, being tough and of a bad flavour, but the liver, which is very large, is said to be sometimes eaten, though it is more frequently used for the purpose of preparing from it a clear oil, which it affords in great plenty.

GUTTATED RAY.

Raja Guttata. *R. subrhombico-dilatata cinerea, albo guttata, capite subproducto, subtus alba, cauda tenui armata.*

Subrhombic-dilated cinereous Ray, spotted with white, with subproduced head, body white beneath, and slender, armed tail.

Marinari. *Marcgr. Bras. Will. p. 66. t. C. 1. f. 5.*

Eel Tenkee. *Russ. ind. t. 8.*

GREATLY allied to the *R. Aquila* in appearance, but with a more produced head or snout: colour above deep cinereous, pretty thickly marked with small, round, white or whitish spots: tail-fins and spine placed nearer the body than in the preceding, of which however it has been sometimes considered as a variety rather than as truly distinct: native of the Indian and African seas: observed by Commerson about the coasts of Madagascar, by

Dr. Russel about those of Coromandel, and long ago by Marcgrave about those of Brasil. The last-mentioned author informs us that it grows to a very large size, is in considerable esteem as a food, and that one fish is sufficient to dine forty persons.

FASCIATED RAY.

Raja Fasciata. *R. grisea, falcato-dilatata, fasciis transversis cæruleis, cauda longa tenui inermi.*

Grey Ray, of a falciform-dilated shape, with transverse blue bands, and long, slender, unarmed tail.

Aquilæ marinæ species. *Will. append. t. 10. f. 3.*

Mookarah Tenkee. *Russ. ind. t. 7.*

OF similar shape and appearance with the *Aquila* and *guttata*, but rather more dilated towards the tips of the pectoral fins, which, as in the two preceding, are sharp-pointed and subfalcated: colour above cinereous, with several broad, transverse, blue bands, of different shades: beneath pale brown: tail of similar shape with that of the *Aquila* and *guttata*, but, so far as hitherto observed, not furnished with a spine.



Hill sculp

FASCIATED RAY.

LYMNA RAY.

Raja Lymna. *R. testacea, cæruleo-maculata, cauda pinnata armata.*
 Subferruginous Ray, with blue spots, and pinnated armed tail.
 R. Lymna. *R. corpore ovali levi testaceo, maculis cæruleis,*
cauda pinnata aculeo uno. Lin. Syst. Nat. Gmel. Forsk.
Arab. p. 17.

THIS, according to Forskal, its first describer, is much allied to the Eagle-Ray and the Fire-Flaire, and is of a reddish brown colour above, besprinkled with numerous oval blue spots of different sizes: the tail is somewhat longer than the body, marked above, for half its length, with two longitudinal blue stripes, and is furnished about the middle with one, and sometimes with two large and serrated spines, which are covered at their base by a blueish-brown skin: the under part of the body is pale or whitish. Native of the Red Sea.

 CUCKOW RAY.

Raja Cuculus. *R. fusco-cærulescens, subtus albida, capite brevi,*
cauda armata.
 Blueish-brown Ray, whitish beneath, with short head, and armed tail.
 Raja Cuculus. *Cepede.*
Pastinaca marina altera. Will. ichth. t. C. 1. f. 3. ?

ALLIED to the *oxyrhinchus*, but never grows to so large a size: colour above either blueish or brown-bay: beneath whitish: head small and short: teeth sharp: across the roof of the mouth a

kind of denticulated cartilage: snout and upper part of the body without spines: on the tail, which is very slender, one or more long denticulated spines. This species is said by Cepede to be caught about the coasts of Cherburgh, and sometimes in the mouth of the Seine. It seems to approach the nearest to the *Pastinaca marina altera* of Fabius Columna, represented on Plate C. 1. f. 3. of Willughby's Ichthyology. It is said by Columna to be called *Altavela* by the Neapolitans, and seems to have been considered by the generality of succeeding ichthyologists as a variety of the *R. Pastinaca*.

PEARLED RAY.

Raja Sephen. *R. fusco-cinerea, subtus albida, corpore supra tuberculato, tuberculis dorsalibus tribus mediis majoribus.*

Cinereous-brown Ray, with the body tuberculated above, with the three middle tubercles larger than the rest.

Raja Sephen. *R. corpore suborbiculato, cauda duplo longiore subtus alata, &c. Lin. Gmel. Forsk. Arab. p. 17.*

SHAPE subrhomboid; the upper part of the body, measured from the tips of the pectoral fins, which are obtuse, forming a half-rhomb: the lower part, from the tips of the pectoral fins to the tail, forming a half-circle: snout small and slightly pointed: ventral fins rather small and rounded: tail more than twice the length of the body, gradually tapering to a fine point, furnished beneath the middle part with a shallow fin running to a considerable distance, and above with a strong and sharp spine, as in the Sting Ray and many others, and some-

times two spines are found instead of one: back, from between the eyes to some distance beyond the base of the tail, covered with pretty close-set tubercles or granules, three of which, in the middle of the back, are far larger than the rest, and resemble three pearls disposed in a longitudinal direction on that part: colour of the whole animal deep cinereous brown above, and reddish white beneath: grows to a large size, sometimes measuring eleven feet from the snout to the end of the tail. Native of the Red Sea.

It is from the skin of this species, according to Cope, that the beautiful substance called *Galuchat* by the French is prepared, and which being coloured with blue, green, or red, according to the fancy of the artist, and afterwards polished, is so frequently used for various kinds of cases, telescope-tubes, &c. &c. For this purpose the smaller or younger specimens are preferred; the tubercles in the more advanced or full-grown animals being too large for the uses above-mentioned.

Var.

Wolga Tenkee. *Russ. pisc. ind. t. 3.*

THIS seems to be a variety of the preceding: the length of the specimen described by Dr. Russel was about nine inches and a half, the tail about two feet nine inches: colour of the whole animal dull leaden above, with deep-blue tail: beneath dusky white: on the middle of the back only two

pearl-formed tubercles instead of three: tail furnished with a sharp spine and a fin beneath, as in the former. Native of the Indian seas.

TUBERCULATED RAY.

Raja Tuberculata. *R. dorso caudaque aculeis subobtusis, depressis, distantibus nitidis.*

Ray with subobtuse, distant, depressed, glossy spines down the back and tail.

Raja tuberculata. *Cepede.*

DESCRIBED by Cepede: general form like that of the Thornback, &c. along the back, and down the tail, at considerable distances from each other, run several strong but short spines, with very broad bases, which have a kind of glossy or enamelled appearance: on the region of the fins are disposed pretty numerous small round tubercles; the tail, which is long and slender, is furnished, exclusive of the distant short spines before-mentioned, with a very long and serrated one, as in the Sting Ray, but with larger and more distinctly marked serratures, resembling the teeth of a saw: colour uncertain. Native of the South-American seas.

RING-TAILED RAY.

Raja Poecilura. *R. subrhomboid-dilatata, cinerea, subtus alba, cauda brevi, tenui, inermi, albo nigroque annulata.*

Subrhombic-dilated cinereous Ray, white beneath, with short, slender, unarmed tail, annulated with black and white.

Tenkee Kunsul. *Russ. ind. t. 6.*

SHAPE very broad in proportion to its length: pectoral fins obtuse: head indistinct: snout very small: eyes rather small: whole animal smooth, and of a deep cinereous colour above, whitish beneath: tail shortish, slender, and annulated by alternate circles of black and white. Native of the Indian seas.

With bilobate front.

DEMON RAY.

Raja Diabolus. *R. falcato-dilata fusca, subtus albida, capite lato bilobo, cauda inermi.*

Falciformly-dilated brown Ray, whitish beneath, with broad bilobate head, and unarmed tail.

Eereegoodie Tenkoo. *Russel ind. t. 9.*

THIS highly singular animal appears to have been first described by Duhamel, from a specimen taken in the year 1723 near Marseilles, measuring about ten feet and a half in length, and weighing six hundred pounds. In point of general shape it is allied to the Eagle and Fasciated Rays, but with a much greater extent of pectoral fins; appearing

extremely broad in proportion to its length: the head, which is of moderate size, is strait or rectilinear in front, each side projecting into a vertically flattened and slightly pointed lobe or wattle of nearly two feet in length, and giving somewhat the appearance of a pair of horns: the eyes, which are large and prominent, are situated on each side the head, nearly at the base of each of the processes above described, and the mouth, which is very wide, is placed as in others of this genus, beneath, measuring about fifteen inches in width: the pectoral fins are of a subtriangular figure, curving downwards on each side, and terminating in a point: the back is very slightly elevated into a somewhat pyramidal form; and at its lower part is situated the dorsal fin, which is of a lengthened shape, and inclines backwards: the ventral fins, in the specimen observed by Duhamel, were somewhat more than a foot in length, and the tail, which was destitute of any fin, was very slender, and measured about four feet six inches in length: the whole animal was every where covered by a smooth skin, without any tubercles or spines: the colour was a cinereous brown above, and paler or more inclining to whitish beneath. This species is an inhabitant of the Mediterranean, Atlantic, and Indian seas: it is said to be chiefly observed about the Azores, where it is known by the name of *Mobular*.

BLACK RAY



MANATIA RAY



CUVIER'S RAY



FRINGED RAY

Hatch & Co.

MANATIA RAY.

Raja Manatia. *R. rhombea nigricans, subtus alba, capite bilobo, cauda inermi, apice pinnata.*

Rhomboid blackish Ray, white beneath, with bilobate head, and unarmed tail, finned at the tip.

Raja Manatia. *Cepede.*

A SPECIES of gigantic magnitude: allied in general appearance to the Demon Ray; length about fifteen feet and a half: breadth about nine feet: the body and pectoral fins, taken together, forming the appearance of a lozenge: each pectoral fin, separately taken, representing an isosceles triangle: the head is rather small in comparison with the body, and of similar shape with that of the former species, being furnished with a flattened, extended process on each side, of the length of about six inches: mouth about ten inches wide: back elevated on the middle into a large tubercle: ventral fins small, and in part covered by the pectoral fins: dorsal fin wanting: tail as in the former species, but terminating in a divided fin: whole animal smooth: colour above black or very deep brown; beneath milk-white: native of the South-American seas, where it is called *Manatia*.

GIORNA RAY.

Raja Giorna. *R. subrhombea fusca, subtus alba, capite bilobo, cauda longa, versus apicem utrinque tuberculata.*

Subrhomboid brown Ray, white beneath, with bilobate head, and long tail, tuberculated on each side towards the tip.

Raja Giorna. *Cepede.*

SIMILAR in general appearance to the two preceding: size very large: colour brown above, with an olivaceous cast on each side; beneath white: head large: horns or appendages blackish, longitudinally striated, and marked with eight rows of tubercles: dorsal and pectoral fins shaped like an isosceles triangle: tail thrice the length of the rest of the animal; smooth for about a fourth of its length, and afterwards tuberculated on both sides: length of the frontal appendages about a tenth part that of the tail. An individual of this species was taken near the coast of Nice, and described by Signior Giorna of Turin.

FABRONIAN RAY.

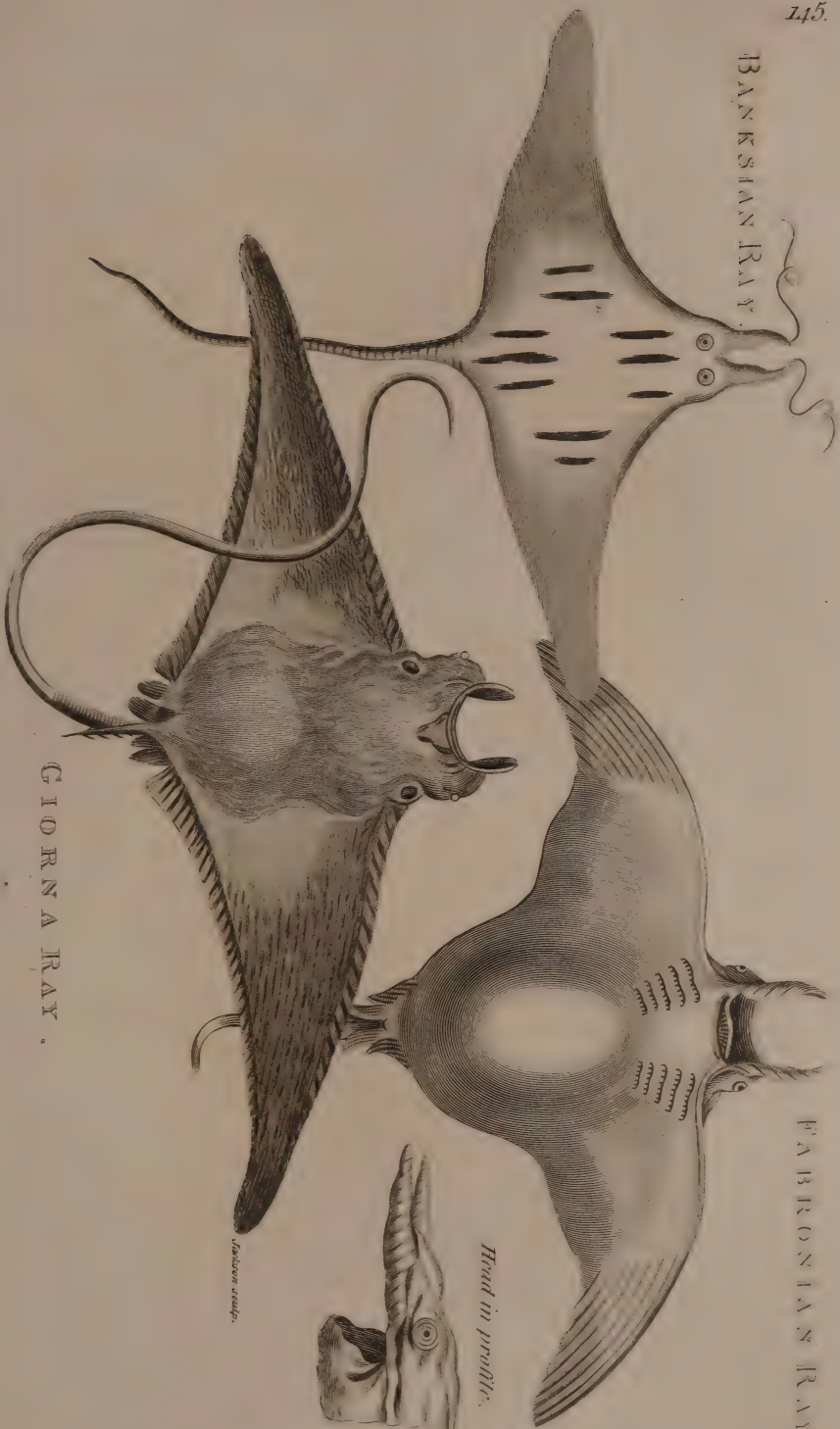
Raja Fabroniana. *R. falcato-dilatata fusca, subtus albida, capite bilobo, lobis pinniformibus.*

Falciformly-dilated brown Ray, whitish beneath, with bilobate head, with fin-like lobes.

Raja Fabroniana. *Cepede.*

SIZE very large: pectoral fins very narrow and falciform: frontal processes long, moveable, and in some degree resembling a kind of fins, composed

BANKSIAN RAY.



Head in profile.

Antennae enlarged.

G. RAY.

of small cartilaginous processes united by a membrane or softer intermediate substance: tail slender, but somewhat mutilated in the specimen described: colour brown, paler or whitish beneath. Native of the Mediterranean sea: observed about the coast of Tuscany, and described by Dr. Fabroni of Florence.

 BANKSIAN RAY.

Raja Banksiana. *R. subrhombea cinerea, strigis longitudinalibus nigris, capite bilobo, cauda tenui inermi.*

Subrhomboid cinereous Ray, with longitudinal black streaks, bilobate head, and slender unarmed tail.

Diabolus marinus. *Will. ichth. append. t. 9. f. 3.*

Raja Banksiana. *Cepede.*

SIZE very large: pectoral fins still narrower than in the Fabronian Ray: colour above cinereous, with several unequal, black, lanceolate streaks disposed over the back between the eyes and pectoral fins: eyes not situated, as in the preceding kinds, at the corners of the head, but on the upper part of the front: the disposition of the black stripes is as follows; viz. three behind the eyes; three similar ones towards the origin of the tail; and two at the base of each of the pectoral fins.

A drawing of this species was sent some years ago from the East Indies, to Sir Joseph Banks, under the name of the Sea-Devil: in the drawing the horn-shaped processes on each side the head were represented as furnished with a very long fibre or process, in one of which a small fish was

represented as entangled: this circumstance appearing very doubtful, it was supposed to have been rather a pictorial licence than a real representation; the processes being probably simple, as in others of this particular tribe: this seems confirmed by a figure given in Willughby's Ichthyology, evidently representing the same species, in which the processes are represented as unfurnished with any filament. Willughby's figure is taken from Nieuhoff, and represents the tail about twice the length of the rest of the animal, seemingly furnished along its under part with a series of small acuminated processes. This species is said to occur in both the Indian oceans, and to be occasionally observed about the coasts of Barbadoes, where a specimen was once taken of so enormous a size as to require seven yoke of oxen to draw it along.

FRINGED RAY.

Raja Fimbriata. *R. subrhombea nigricans, capite bilobo, cauda utrinque fimbriata.*

Subrhomboid blackish Ray, with bilobate head, and tail fimbriated on each side.

Raie frangé. *Cepede.*

Size very large: colour above very deep brown; beneath whitish: eyes situated on the upper part of the head, as in the major part of the genus: pectoral fins terminating in a moveable tip, and together with the body, forming a rhomboidal outline: tail long, slender, and fringed along each side



TORPEDO RAY.

with a row of small processes or appendages, extending some distance up the sides of the body and edges of the pectoral fins. Native of the American seas.

It may be doubted whether this be any thing more than a variety, or, perhaps, sexual difference of the preceding Ray; and it is remarkable that in Willughby's figure of the Sea-Devil the tail, as before observed, is marked by a series of small appendages, though it does not clearly appear whether they are meant to be represented as belonging to one side of the tail or to the under part.

Of a rounded shape.

TORPEDO RAY.

Raja Torpedo. *R. subfusca lavis*, dorso utrinque poris pertusis sparsis.

Brownish smooth Ray, with the back marked on each side by scattered pores.

Raja Torpedo. *R. tota lavis*. *Lin. Syst. Nat.*

Torpedo. *Plin. Bellon. Gesn. Rondel. Aldr. Jonst. Redi. Will. &c. &c.*

Cramp Ray. *Penn. Brit. Zool.*

THE Torpedo has been celebrated both by ancients and moderns for its wonderful faculty of causing a sudden numbness or painful sensation in the limbs of those who touch or handle it. This power the ancients, unacquainted with the theory of electricity, were contented to admire, without attempting to explain; and, as is usual in similar cases, magnified it into an effect little short of what

is commonly ascribed to enchantment. Thus we are told by Oppian that the Torpedo, conscious of his latent faculty, when caught by a hook, exerts it in such a manner that, passing along the line and rod, it benumbs the astonished fisherman, and suddenly reduces him to a state of helpless stupefaction.

“ *Ναι μὲν καὶ νάρκη,*” &c.

The hook'd Torpedo, with instinctive force
Calls all his magic from its secret source :
Quick thro' the slender line and polish'd wand
It darts ; and tingles in th' offending hand *.
The palsied fisherman, in dumb surprise,
Feels thro' his frame the chilling vapours rise :
Drops the lost rod, and seems, in stiffening pain,
Some frost-fix'd wanderer on the polar plain.

It is affirmed by Pliny that the Torpedo, even when touched with a spear, or stick, can benumb the strongest arm, and stop the swiftest foot.

It is well observed by Dr. Bloch that these exaggerations on the part of the ancients are the less to be wondered at when we reflect on similar ones in modern times. Thus, when Muschenbrook happened accidentally to discover and feel the effect of the electric shock from what is called the Leyden vial, he represented it of so terrible a nature as to affect his health for several days afterwards, and declared that he would not undergo a second for

* There are not wanting some who insist that this is no exaggeration, and that the electricity of the Torpedo is really conducted in this manner.

the whole kingdom of France. Yet this is now the common amusement of philosophical curiosity.

The observations of the learned Redi and others in the 17th century, had tended, in some degree, to elucidate the peculiar actions and anatomy of the Torpedo; but it was reserved for more modern times, and for our own ingenious countrymen in particular, to explain in a more satisfactory manner the particulars of its history; and to prove that its power is truly electric. The first experiments of this kind were made by Mr. Walsh of the Royal Society of London, at Rochelle in France, in the year 1772.

“The effect of the Torpedo,” says Mr. Walsh, “appears to be absolutely electrical, forming its circuit through the same conductors with electricity, and being intercepted by the same non-conductors, as glass and sealing-wax. The back and the breast of the animal appear to be in different states of electricity, I mean in particular the upper and lower surfaces of the two assemblages of pliant cylinders engraved in the work of Lorenzini *. By the knowledge of this circumstance we have been able to direct his shocks, though they were small, through a circuit of four persons, all feeling them, and likewise through a considerable length of wire held by two insulated persons, one touching his lower surface, and the other his upper. When the wire was exchanged for glass or sealing-wax no effect could be obtained: but as soon as it was re-

* *Observazioni intorno alle Torpedini.* 1678.

sumed the two persons became liable to the shock. These experiments have been varied many ways, and repeated times without number, and they all determined the choice of conductors to be the same in the Torpedo as in the Leyden phial. The sensations likewise, occasioned by the one and the other in the human frame, are precisely similar. Not only the shock, but the numbing sensation, which the animal sometimes dispenses, expressed in French by the words *engourdissement* and *fourmillement*, may be exactly imitated with the phial, by means of Lane's electrometer: the regulating rod of which, to produce the latter effect, must be brought almost into contact with the prime conductor which joins the phial. It is a singularity that the Torpedo, when insulated, should be able to give us, insulated likewise, forty or fifty successive shocks from nearly the same part; and these with little, if any diminution of their force. Each effort of the animal to give the shock is conveniently accompanied by a depression of his eyes, by which even his attempts to give it to non-conductors can be observed: in respect to the rest of his body he is in a great degree motionless, though not entirely so. I have taken no less than fifty of the above-mentioned successive shocks from an insulated Torpedo in the space of a minute and half. All our experiments confirm that the electricity of the Torpedo is condensed, in the instant of its explosion, by a sudden energy of the animal; and as there is no gradual accumulation, or retention of it, as in case of charged glass, it is not at all sur-

prising that no signs of attraction or repulsion were perceived in the pith balls. In short the effect of the Torpedo appears to arise from a compressed elastic fluid, restoring itself to its equilibrium in the same way and by the same mediums as the elastic fluid compressed in charged glass. The skin of the animal, bad conductor as it is, seems to be a better conductor of his electricity than the thinnest plate of elastic air. Notwithstanding the weak spring of the torpedinal electricity, I was able, in the public exhibitions of my experiments at La Rochelle, to convey it through a circuit formed from one surface of the animal to the other, by two long brass wires, and four persons, which number, at times, was encreased even to eight. The several persons were made to communicate with each other, and the two outermost with the wires, by means of water contained in basins properly disposed between them for that purpose."

This curious and convincing experiment is thus related by Mons^r. Seignette (mayor of La Rochelle, and one of the secretaries of its academy), published in the French gazettes for the month of October in the above year.

"A live Torpedo was placed on a table. Round another table stood five persons insulated. Two brass wires, each thirteen feet long, were suspended to the ceiling by silken strings. One of these wires rested by one end on the wet napkin on which the fish lay: the other end was immersed in a basin full of water placed on the second table, on which stood four other basins likewise full of water. The

first person put a finger of one hand in the basin in which the wire was immersed, and a finger of the other hand in a second basin. The second person put a finger of one hand in this last basin, and a finger of the other hand in the third; and so on successively, till the five persons communicated with one another by the water in the basins. In the last basin one end of the second wire was immersed; and with the other end Mr. Walsh touched the back of the Torpedo, when the five persons felt a commotion which differed in nothing from that of the Leyden experiment, except in the degree of force. Mr. Walsh, who was not in the circle of conduction, received no shock. This experiment was repeated several times, even with eight persons; and always with the same success. The action of the Torpedo is communicated by the same mediums as that of the electric fluid. The bodies which intercept the action of the one, intercept likewise the action of the other. The effects produced by the Torpedo resemble in every respect a weak electricity. This exhibition of the electric powers of the Torpedo, before the Academy of La Rochelle, was at a meeting, held for the purpose in my apartments, on the twenty-second of July 1772, and stands registered in the Journals of the Academy."

Mr. Walsh, in his paper on this subject, in the Philosophical Transactions, thus continues the account of these interesting experiments. "The effect of the animal, in the above experiments, was transmitted through as great an extent and variety

of conductors as almost at any time we had been able to obtain it, and the experiments included nearly all the points in which its analogy with the Leyden phial had been observed. These points were stated to the gentlemen present, as were the circumstances in which the two effects appeared to vary. It was likewise represented to them, that our experiments had been almost wholly with the animal in air: that its action in water was a capital desideratum: that indeed all as yet done was little more than opening the door to inquiry: that much remained to be examined by the electrician as well as the anatomist: that as artificial electricity had thrown light on the natural operation of the Torpedo, this might in return, if well considered, throw light on artificial electricity; particularly in those respects in which they now seemed to differ. The Torpedo in these experiments dispensed only the distinct, instantaneous stroke, so well known by the name of the electric shock. That protracted but lighter sensation, that torpor or numbness which he at times induces, and from which he takes his name, was not then experienced from the animal; but it was imitated with artificial electricity, and shewn to be producible by a quick consecution of minute shocks. This, in the Torpedo, may perhaps be effected by the successive discharge of his numerous cylinders, in the nature of a running fire of musketry: the strong single shock may be his general volley. In the continued effect, as well as in the instantaneous, his eyes, which are usually prominent, are withdrawn into their sockets."

“ A large Torpedo, very liberal of his shocks, being held with both hands by his electric organs above and below, was briskly plunged into water to the depth of a foot, and instantly raised an equal height in air; and was thus continually plunged and raised, as quick as possible, for the space of a minute. In the instant his lower surface touched the water in his descent, he always gave a violent shock, and another, still more violent, in his ascent; both which shocks, but particularly the last, were accompanied with a writhing in his body, as if meant to force an escape. Besides these two shocks from the surface of the water, which may yet be considered as delivered in the air, he constantly gave at least two when wholly in the air, and as constantly one, and sometimes two, when wholly in the water. The shocks in water appeared, as far as sensation could decide, not to have near a fourth of the force of those which took place at the surface of the water, nor much more than a fourth of those intirely in air.”

“ The shocks received in a certain time were not, on this occasion, counted by a watch, as they had been on a former, when fifty were delivered in a minute and half, by the animal in an insulated and unagitated state: but from the quickness with which the immersions were made, it may be presumed there were full twenty of these in a minute; from whence the number of shocks in that time must have amounted to above an hundred. This experiment therefore, while it discovered the comparative force between a shock in water and one

in air, and between a shock delivered with greater exertion on the part of the animal and one with less, seemed to determine, that the charge of his organs with electricity was effected in an instant, as well as the discharge."

"The Torpedo was then put into a flat basket, open at the top, but secured by a net with wide meshes, and in this confinement was let down into the water about a foot below the surface: being there touched through the meshes, with only a single finger, on one of his electric organs, while the other hand was held at a distance in the water, he gave shocks which were distinctly felt in both hands."

"The circuit for the passage of the effect being contracted to the finger and thumb of one hand, applied above and below to a single organ, produced a shock, to our sensation, of twice the force of that in the larger circuit by the arms."

"The Torpedo still confined in the basket, being raised to within three inches of the surface of the water, was there touched with a short iron bolt, which was held half above and half in the water, by one hand, while the other hand was dipped, as before, at a distance in the water; and strong shocks, felt in both hands, were thus obtained through the iron."

"A wet hempen cord being fastened to the iron bolt, was held in the hand above water, while the bolt touched the Torpedo, and the shocks were obtained through both these substances."

"A less powerful Torpedo, suspended in a small

net, being frequently dipped into water and raised again, gave, from the surface of the water, slight shocks, through the net, to the person holding it."

"These experiments in water manifested, that bodies, immersed in that element, might be affected by immediate contact with the Torpedo; that the shorter the circuit in which the electricity moved, the greater would be the effect; and that the shock was communicable, from the animal in water, to persons in air, through some substances."

"How far harpoons and nets, consisting of wood and hemp, could in like circumstances, as it has been frequently asserted, convey the effect, was not so particularly tried as to enable us to confirm it. I mention the omission in hope that some one may be induced to determine the point by express trial."

"We convinced ourselves, on former occasions, that the accurate Kämpfer, who so well describes the effect of the Torpedo, and happily compares it with lightning, was deceived in the circumstance, that it could be avoided by holding in the breath, which we found no more to prevent the shock of the Torpedo, when he was disposed to give it, than it would prevent the shock of the Leyden phial."

"Several persons, forming as many distinct circuits, can be affected by one stroke of the animal, as well as when joined in a single circuit. For instance, four persons, touching separately his upper and lower surfaces, were all affected; two persons likewise, after the electricity had passed through a wire into a basin of water, transmitted it from

thence, in two distinct channels, as their sensation convinced them, into another basin of water, from whence it was conducted, probably in an united state, by a single wire. How much further the effect might be thus divided and subdivided into different channels, was not determined; but it was found to be proportionably weakened by multiplying these circuits, as it had been by extending the single circuit."

The body of the Torpedo is of a somewhat circular form, perfectly smooth, slightly convex above, and marked along each side of the spine by several small pores or foramina: the colour of the upper surface is usually a pale reddish brown, sometimes marked by five large, equidistant, circular dusky spots with paler centres: the under surface is whitish or flesh-coloured. The Torpedo however is observed to vary considerably in the cast and intensity of its colours. The general length of the Torpedo seems to be about eighteen inches or two feet, but it is occasionally found of far larger dimensions, specimens having been taken on our own coasts of the weight of fifty, sixty, and even eighty pounds. A specimen weighing fifty-three pounds was found, according to Mr. Pennant, to measure four feet in length, and two and a half in breadth: the head and body, which were indistinct, were nearly round; about two inches thick in the middle, attenuating to extreme thinness on the edges: below the body the ventral fins formed on each side a quarter of a circle: the two dorsal fins were placed on the trunk of the tail: the eyes were

small, placed near each other: behind each was a round spiracle, with six small cutaneous rays on their inner circumference: the mouth was small; the teeth minute and spicular: the colour of the animal was cinereous brown above, and white beneath. The Torpedo is an inhabitant of most seas, but seems to arrive at a larger size in the Mediterranean than elsewhere. It is generally taken with the trawl, but has been sometimes known to take a bait, thus justifying the description of Oppian. It commonly lies in water of about forty fathoms depth, in company with others of this genus. It preys on smaller fish, and according to Mr. Pennant a surmullet and a plaice have been found in the stomach of two of them: the surmullet, as Mr. Pennant well observes, is a fish of that swiftness, that it would be impossible for the Torpedo to take it by pursuit: we must therefore suppose that it stupefies its prey by exerting its electric faculty. The Torpedo often inhabits sandy places, burying itself superficially, by flinging the sand over it, by a quick flapping of all the extremities. It is in this situation that it gives its most forcible shock, which is said to throw down the astonished passenger that inadvertently treads on the animal.

The Torpedo, with respect to its general anatomy, does not materially differ from the rest of the Ray tribe, except in its electric or Galvanic organs, which are thus accurately described by Mr. Hunter.

“ These organs are placed on each side of the cranium and gills, reaching from thence to the

semicircular cartilages of each great fin, and extending longitudinally from the anterior extremity of the animal to the transverse cartilage which divides the thorax from the abdomen; and within these limits they occupy the whole space between the skin of the upper and of the under surface: they are thickest at the edges, near the centre of the fish, and become gradually thinner towards the extremities. Each electric organ, at its inner longitudinal edge, is a convex elliptic curve. The anterior extremity of each organ makes the section of a small circle; and the posterior extremity makes nearly a right angle with the inner edge. Each organ is attached to the surrounding parts by a close cellular membrane, and also by short and strong tendinous fibres, which pass directly across, from its outer edge, to the semicircular cartilages. They are covered above and below by the common skin of the animal; under which there is a thin fascia spread over the whole organ. This is composed of fibres, which run longitudinally, or in the direction of the body of the animal: these fibres appear to be perforated in innumerable places; which gives the fascia the appearance of being fasciculated: its edges, all round, are closely connected to the skin, and at last appear to be lost, or to degenerate into the common cellular membrane of the skin. Immediately under this is another membrane, exactly of the same kind, the fibres of which in some measure decussate those of the former, passing from the middle line of the body outwards and backwards. The inner edge of this is lost with the first

described ; the anterior, outer, and posterior edges are partly attached to the semicircular cartilages, and partly lost in the common cellular membrane. This inner fascia appears to be continued into the electric organ, by so many processes, and thereby makes the membranous sides or sheaths of the columns, which are presently to be described ; and between these processes the fascia covers the end of each column, making the outermost or first partition. Each organ is about five inches in length, and, at the anterior end three in breadth, though it is but little more than half as broad at the posterior extremity. Each consists wholly of perpendicular columns, reaching from the upper to the under surface of the body, and varying in their lengths, according to the thickness of the parts of the body where they are placed ; the longest column being about an inch and half, and the shortest about one fourth of an inch in length, and their diameters about two tenths of an inch. The figures of these columns are very irregular, varying according to situation and other circumstances. The greatest number of them are either irregular hexagons, or irregular pentagons ; but from the irregularity of some of them it happens that a pretty regular quadrangular column is sometimes formed. Those of the exterior row are either quadrangular or hexagonal, having one side external, two lateral, and either one or two internal. In the second row they are mostly pentagons. Their coats are very thin, and seem transparent, closely connected with each other, having a kind of loose network of

tendinous fibres, passing transversely and obliquely between the columns, and uniting them more firmly together. These are mostly observable where the large trunks of the nerves pass. The columns are also attached by strong inelastic fibres, passing directly from the one to the other. The number of columns in different Torpedos of rather small size, appears to be about 470 in each organ, but the number varies according to the size of the fish; and in a very large Torpedo the number of columns in one electric organ was 1182. They must therefore increase, not only in size but in number, during the growth of the animal, new ones forming perhaps every year on the exterior edges, as they are much the smallest. This process may be similar to the formation of new teeth in the human jaw, as it increases. Each column is divided by horizontal partitions, placed over each other at very small distances, and forming numerous interstices, which appear to contain a fluid. These partitions consist of a very thin membrane, considerably transparent. Their edges appear to be attached to one another, and the whole is attached by a fine cellular membrane to the inside of the columns. They are not totally detached from one another; and I have found them adhering at different places, by blood-vessels passing from one to another. The number of partitions contained in a column of one inch in length, of a Torpedo which had been preserved in proof spirit, appeared, upon a careful examination, to be one hundred and fifty: and this number, in a given length of column

appears to be common to all sizes in the same state of humidity, for by drying they may be greatly altered; whence it appears probable that the increase in the length of a column, during the growth of the animal, does not enlarge the distance between each partition in proportion to the growth; but that new partitions are formed and added to the extremity of the column from the fascia. The partitions are very vascular; the arteries are branches from the veins of the gills, which convey the blood that has received the influence of respiration. They pass along with the nerves to the electric organ, and enter with them: then ramify, in every direction, into innumerable small branches upon the sides of the columns, sending in from the circumference all around upon each partition small arteries, which ramify and anastomose upon it; and passing also from one partition to another, anastomose with the vessels of the adjacent partitions. The veins of the electric organ pass out, close to the nerves, and run between the gills, to the auricle of the heart. The nerves inserted into each electric organ, arise by three very large trunks from the lateral and posterior part of the brain. The first of these, in its passage outwards, turns round a cartilage of the cranium, and sends a few branches to the first gill, and to the anterior part of the head, and then passes into the organ towards its anterior extremity. The second trunk enters the gills between the first and second openings, and after furnishing it with small branches, passes into the organ near its middle. The third trunk,

after leaving the skull, divides itself into two branches, which pass to the electric organ through the gills; one between the second and third openings, the other between the third and fourth, giving small branches to the gill itself. These nerves having entered the organs, ramify in every direction between the columns, and send in small branches upon each partition where they are lost. The magnitude and number of the nerves bestowed on these organs in proportion to their size, must on reflection appear as extraordinary as the phenomena they afford. Nerves are given to parts either for sensation or action. If we except the more important senses of hearing, seeing, tasting, and smelling, which do not belong to the electric organs, there is no part, even of the most perfect animal, which, in proportion to its size, is so liberally supplied with nerves; nor do the nerves seem necessary for any sensation which can be supposed to belong to the electric organs; and, with respect to action, there is no part of any animal with which I am acquainted, however strong and constant its natural actions may be, which has so great a proportion of nerves. If it be then probable that those nerves are not necessary for the purposes of sensation or action, may we not conclude that they are subservient to the formation, collection, or management of the electric fluid? especially as it appears evident from Mr. Walsh's experiments, that the will of the animal does absolutely control the electric powers of its body; which must depend on the energy of the nerves."

From the above description it appears that the electric organs of the Torpedo constitute a pair of Galvanic batteries, disposed in the form of perpendicular hexagonal columns. In the *Gymnotus electricus* on the contrary the Galvanic battery is disposed lengthwise on the lower part of the animal.

We are informed by the ingenious Dr. Ingenhouz, that on taking up some Torpedos about twenty miles from Leghorn, he observed that on pressing gently with the thumbs on the upper side of the two soft bodies on each side the head (the electric organs), in about the space of a minute or two he felt a sudden trembling in the thumbs, which extended no farther than the hands, and lasted about two seconds, perfectly resembling the sensation produced by a great number of very small electrical bottles discharged in quick succession through the hand. After some seconds the sensation returned, and again at more distant intervals. Sometimes it was so strong as almost to oblige the hand to let go the fish; and at other times was but weak, and after the fish had given one strong shock, it did not seem soon to lose the power of communicating one of similar strength; and it was sometimes found that when the shocks followed one another in quick succession, the last were stronger than the first.

The celebrated Spallanzani informs us that some few minutes before the Torpedo expires, the shocks which it communicates, instead of being given at distant intervals, take place in quick succession, like the pulsations of the heart: they are weak

indeed, but perfectly perceptible to the hand when laid on the fish at this juncture, and resemble very small electric shocks. In the space of seven minutes, no less than three hundred and sixty of these small shocks were perceived. Spallanzani also assures us of another highly curious fact, which he had occasion to verify from his own experience, viz. that the young Torpedo can not only exercise its electric faculty as soon as born, but even while it is yet a foetus in the body of the parent animal. This fact was ascertained by Spallanzani on dissecting a Torpedo in a pregnant state, and which contained in its ovarium several roundish eggs of different sizes, and also two perfectly formed foetuses, which, when tried in the usual manner, communicated a very sensible electric shock, and which was still more perceptible when the little animals were insulated by being placed on a plate of glass.

The electricity of the Torpedo is altogether voluntary, and sometimes, if the animal be not irritated, it may be touched, or even handled without being provoked to exert its electric influence.

SPOTTED RAY.

Raja Maculata. *R. rotundata glabra subfusca, nigro maculata, subtus alba.*

Rounded, smooth, brownish Ray, spotted with black, white beneath.

Temerece. *Russ. ind. t. 1.*

SHAPE rounded, nearly as in the Torpedo: colour above dusky-brown, thickly marked on all parts with moderately large, round, black spots: beneath white: head indistinct: eyes small: tail rather short and thick, with two fins above, and a terminal one: length, from the nose to the tip of the tail, about a foot and a half. Native of the Indian seas.

 BLACK-AND-WHITE RAY.

Raja Bicolor. *R. rotundata, glabra, alba, nigro maculata, subtus alba.*

Rounded, smooth, white Ray, spotted with black, white beneath.

Nalla Temerece. *Russ. ind. t. 2.*

OF similar size and shape with the preceding, but differing in colour, being white above, marked on all parts with numerous, round, black spots: beneath white. This seems to be either a variety or a sexual difference of the preceding species. Native of the Indian seas.

RAJA RHINOBATOS. Lin.



finch only

THOUNIAN RAY.

CHINESE RAY.

Raja Sinensis. *R. rotundata, fusco-flavescens, subtus rosea, supra spinis parvis brevibus sparsis.*

Rounded, yellowish-brown Ray, rose-coloured beneath, marked above with small, short, scattered spines.

Raie Chinois. *Cepede.*

DESCRIBED by Cepede on the authority of a Chinese drawing: outline nearly orbicular, or as in the Torpedo: head a little pointed: upper surface of the animal covered with small, short, scattered spines: colour above yellowish brown, beneath pale rose: tail furnished on each side with a row of short spines, and terminated by a lobed fin.

Of a lengthened shape.

Raja Rhinobatos. *R. elongata fusca, rostro producto, unico aculeorum ordine dorsali.*

Elongated brown Ray, with lengthened snout, and single row of dorsal spines.

Raja Rhinobatos. *R. oblonga, unico aculeorum ordine in medio dorso.* *Lin. Syst. Nat.*

Rhinobatos seu Squatino-Raja. *Salv. Will. &c.*

THIS remarkable species seems from its habit to connect in some degree the genera of *Raja* and *Squalus*, the body being much longer than in the preceding kinds of Ray: the snout is lengthened, but not very sharp, and the body, which is moder-

ately convex above, and flat beneath, gradually tapers from the shoulders to the tail, which is furnished above with two fins, of an oblong shape, and situated at a considerable distance from each other: the tip of the tail is also dilated into an oblong fin. The colour of the whole animal is a dull earthy brown, paler beneath, and the skin is every where roughened by minute tubercles. This fish is said to grow to the length of about four feet, and is a native of the European seas. It is observed to be more frequent about the coasts of Naples than elsewhere.

THOUINIAN RAY.

Raja Thouiniana. *R. elongata nigricans, subtus nivea, rostro elongato, capite utrinque niveo.*

Elongated brown Ray, with lengthened snout, head white on each side, and whole animal snow-white beneath.

Raja Thouin. *Cepede.*

GREATLY allied to the preceding species, but rather wider across the upper part of the body, and with a thinner and sharper snout, and a flatter body: colour of the whole animal above black-brown, except on each side the head, where it is milk-white, the snout which is dark, like the body, forming a broad band between: the whole under surface of the animal is also milk-white: along the back, from between the eyes to the end of the tail, runs a series of pretty sharp simple spines, and the remainder of the skin is roughened by small pro-

tuberances. This elegant species is described by Cedepe from a specimen preserved in the Museum of the Prince of Orange, now translated to Paris, and forming a part of the national Museum of France.

ARABIAN RAY.

Raja Djiddensis. *R. subelongata subcinerea scabra, maculis ovatis albidis.*

Subelongated, subcinereous, rough ray, with whitish, ovate spots.

Raja Djiddensis. *R. pinna caudæ biloba, &c. Forsk. Arab. p. 18.*

Of similar shape with the two preceding: length about two yards: colour pale cinereous, with the dorsal and anal fins of a more glaucous cast: skin roughish: back pretty convex, and marked on the widest part with ovate whitish spots: colour of the under parts whitish; varied beyond the vent with irregular dusky bars. Native of the Red Sea: observed by Forskal.

CUVIER'S RAY.

Raja Cuvieri. *R. subrhombico-elongata, fusca, subnigro maculata, cauda triplici aculeorum serie.*

Subrhombic-elongated brown Ray, with blackish spots, and three rows of spines on the tail.

Raja Cuvier. *Cedepe.*

ALLIED to the preceding species, but of a less lengthened shape, so as almost to resemble the first

division of the genus : first dorsal fin situated considerably nearer the head: snout long and pointed, and furnished, as well as the head, with a few spines: pectoral fins very large, and angular: ventral fins each marked into two portions or lobes: tail slender, and about twice the length of the head and body together: from the first dorsal fin, to the base of the tail, a row of spines: colour brown, marked above with numerous dusky spots: tail armed with a triple row of weak spines. Described by Cope from Cuvier, who saw it in a dried state.

SQUALUS. SHARK.

Generic Character.

<i>Os</i> in anteriore et inferiore capitis parte, dentibus numerosis seriatis.	<i>Mouth</i> situated beneath the anterior part of the head, with numerous teeth disposed in rows.
<i>Spiracula</i> utrinque ad latera colli, plerisque quinque.	<i>Spiracles</i> on each side the neck, in most species five in number, of a semilunar shape.
<i>Corpus</i> oblongum, teretiusculum.	<i>Body</i> oblong, somewhat cylindrical.

THE animals of this genus are altogether marine: and are said to be much rarer in the Baltic than in any other sea: they are viviparous, and are observed to produce more young at a time than the Rays, but each included, as in those fishes, in a quadrangular capsule or involucrum, each extremity of which is extended into a long, contorted, cartilaginous thread of great length. Many of the Sharks are said to emit a phosphoric light during the night: they are chiefly of a solitary nature, and, in general, devour with indiscriminating voracity, almost every animal substance, whether living or dead: some few species however are observed to feed chiefly on fuci and other marine vegetables.

WHITE SHARK.

Squalus Carcharias. S. albidocinereus, rostro subacuto, dentibus triangularibus serratis.

Pale-cinereous Shark, with subacute snout, and triangular serrated teeth.

Squalus Carcharias. S. dorso plano, dentibus serratis. Lin. Syst. Nat. Arted. gen. 70. syn. 98.

Canis Carcharias seu Lamia. Rondel. Gesn. Aldr. Will. &c.

Lamia. Arist. Plin. &c.

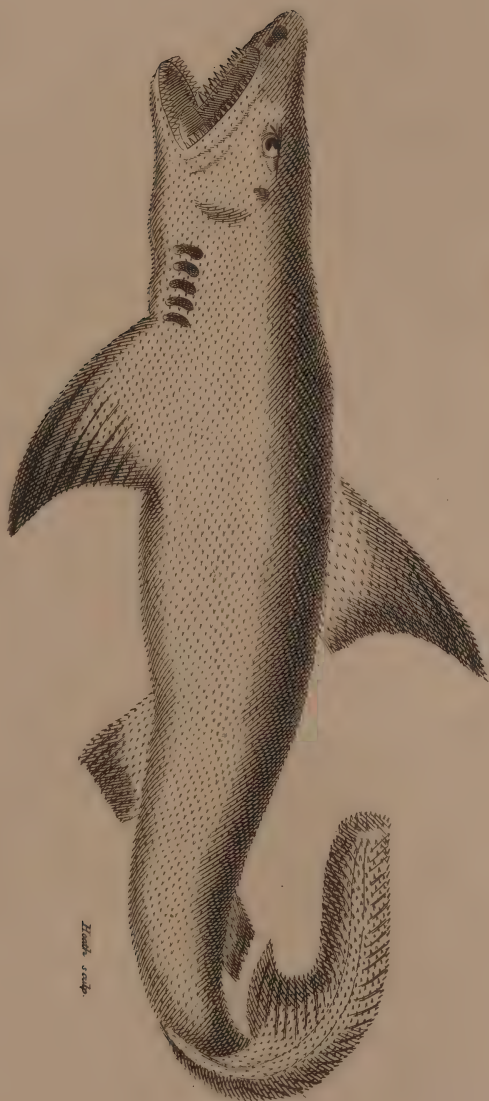
White Shark. *Penn. Brit. Zool.*

Requin. *Bomare dict. d'hist. nat. Cepede. &c.*

THE great or white Shark, so remarkable for its vast size and its powers of destruction, is an inhabitant of most parts of the globe, though much more frequently seen in the warmer than the colder latitudes: it is said to reside principally in the depths of the ocean, from whence it rises at intervals in order to prowl for prey, and is considered as the most voracious of all the inhabitants of the deep. It arrives at the length of more than thirty feet, and is of a somewhat thicker or broader form than most of the genus: the head is of a depressed shape, and broad; terminating in front in an obtusely pointed snout: the mouth is of vast width, and furnished on the margin of each jaw with from three to six rows of strong flat, triangular, sharp-pointed, and finely serrated teeth, which are so imbedded in their investing cartilage as to be either raised or depressed at pleasure: the tongue is broad, thick, and cartilaginous, and the throat extremely wide: the eyes, as in most of the genus, of



ZEBRA SHARK.



WHITE SHARK.

Thomson's

a blueish or greenish cast, rather small, and half overhung by their skinny veil: the pectoral fins are large, strong, broad, and pointed: the first dorsal fin moderately large, somewhat falcated behind, and pointed: the second is situated very low on the back, near the origin of the tail which is slightly lengthened, and of a bilobate shape, the upper lobe or division slightly pointed, and the lower or terminal lobe rather rounded: so great is the strength of this part, that even a young Shark of about six feet in length is able by a stroke of its tail to break a man's leg; it is usual therefore with sailors to cut off the tail the instant they drag a shark on board: the anal fin is placed somewhat beyond the middle of the abdomen, and is of moderate size, and of a somewhat square outline: the general colour of the whole animal is a pale or whitish ash, darker or browner on the upper parts: the mouth is situated considerably beneath the front, for which reason the animal is said, like most others of this genus, to be obliged to turn on its back in order to seize its prey; an observation as ancient as the days of Pliny, "*resupinati vorant: affert moram providentia Naturæ, quia nisi resupini atque conversi, non corripiunt.*" *Plin. lib. 9. c. 8.* This however is much doubted by Dr. Bloch, who rather supposes the Shark to seize its prey in a direct position, or like the generality of fishes. The skin of the Shark is very rough, and is used for a kind of shagreen, as well as for smoothing various kinds of wood-work, &c. and from the liver is drawn a great quantity of oil.

“Sharks (says Mr. Pennant), are the dread of sailors in all hot climates, where they constantly attend the ships, in expectation of what may drop overboard: a man that has that misfortune perishes without redemption: they have been seen to dart at him like gudgeons to a worm.” They are said to attack Negroes in preference to Europeans, and are observed in particular to attend with unremitting assiduity the passage of the slave-ships from the coasts of Africa to the West-Indian islands, and, as Cepede very happily and justly observes, may be considered as forming a proper escort to the cruel conductors of those most accursed vessels. “A master of a Guinea-Ship (says Pennant) informed me that a rage of suicide prevailed among his new-bought slaves, from a notion the unhappy creatures had, that after death they should be restored again to their families, friends, and country. To convince them that at least they should not reanimate their bodies, he ordered one of their corpses to be tied by the heels to a rope, and lowered into the sea; and though it was drawn up again as fast as the united force of the crew could be exerted, yet in that short space the Sharks had devoured every part but the feet, which were secured at the end of the cord. Swimmers very often perish by them: sometimes they lose an arm or a leg, and sometimes are bit quite asunder, serving but for two morsels for this ravenous animal: a melancholy tale of this kind is recited in a West-Indian ballad, preserved in Dr. Percy’s *Reliques of ancient English poetry*.”

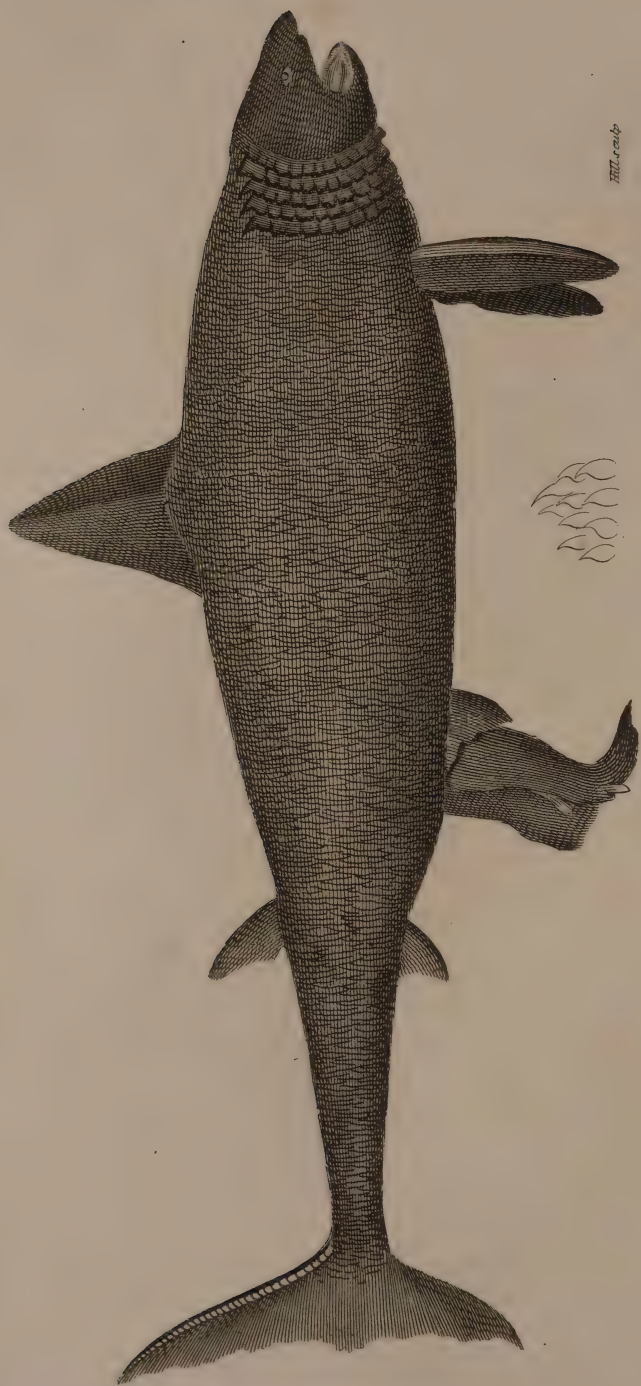
The size to which the Shark sometimes grows is far superior to that mentioned in the former part of the present description: we are informed by Gillius that a Shark was seen of the weight of four thousand pounds, and that in the belly of one was found an entire human body, and Müller asserts that in a Shark taken at the isle of St. Margaret, was found a horse*, which had probably been thrown overboard from some ship. The size of the fossil teeth of this species, so often found in the isle of Malta and elsewhere affords a convincing proof of the enormous specimens which have once existed. In the British Museum are teeth of this kind measuring at least four inches and a half from the point to the base, and six inches from the point to the corner: the animal therefore to which such teeth belonged must have been equal to the largest of the Cetacea in volume, and we may well admit the probability of a human body being swallowed by such a fish, not only entire, but even without a wound, and on this supposition it is that the Shark has been imagined by some to have been the fish ordained for the temporary confinement of the prophet Jonas†.

The internal parts of the Shark present many

* The Shark does not spare even its own species. A Laplander, according to Leems, had taken a Shark, and fastened it to his canoe; but soon missed it, without being able to guess how: in a short time afterwards he caught a second of much larger size, in which, when opened, he found the one he had lost.

† *Jonam prophetam, ut veteres Herculem trinocem, in hujus ventriculo tridui spatio hæsisse verosimile est. Lin. Syst. Nat.*

remarkable particulars: the brain is small: the heart furnished with one ventricle and one auricle, which latter is of very large size, and receives the vena cava: the aorta and other arteries are of great strength: the throat is very short, and of a diameter not greatly inferior to that of the beginning of the stomach, which is of vast size, and dilatable to a great degree: the intestinal canal consists of two portions, one analogous to the small, and the other to the large intestines of quadrupeds, but this latter portion is very short in proportion, and is so composed as to compensate by its interior structure for its brevity, since instead of forming a mere continued tube, as in most animals, it consists rather of a large series of meshes or divisions, placed in a spiral direction throughout its length: the liver is large, and divided into two unequal lobes: in the stomach and intestines, according to Commerson, are usually found a great many tæniæ or tape-worms, which not only infest the cavities of these parts, but even penetrate into and lodge themselves between the interior coats: these animals therefore, by their vellication and motions, must be supposed to aggravate the natural voracity of the Shark, and to impel it to engorge a large quantity of food, in order to allay the sensations excited by these internal enemies: the milt, in the male fish is disposed into two portions, and equals the length of about a third of the whole animal; and in the female the ovaries are of similar length: during the breeding-season, which takes place at different periods in different climates, the Sharks are



BASKING SHARK. male.



observed to approach the shores, in order to deposit their young in the most favourable situations: these are discharged, to the number of two or three at a time, still adhering to the capsule in which they had been before inclosed, and are excluded before the young animal has had time to break from it: the length of the newly-hatched Shark does not exceed that of a few inches.

I must not conclude the present article without giving the reader the Count de Cepede's explanation of the French name *Requin*, by which this species is known. The word, according to this author, is a corruption of *requiem*. "*Requin est, en effet, un corruption de requiem, qui designe depuis longtemps, en Europe, la mort et le repos eternel.*"

BASKING SHARK.

Squalus Maximus. S. plumbeo-fuscus, subtus albicans, dentibus parvulis conico-subulatis numerosissimis.

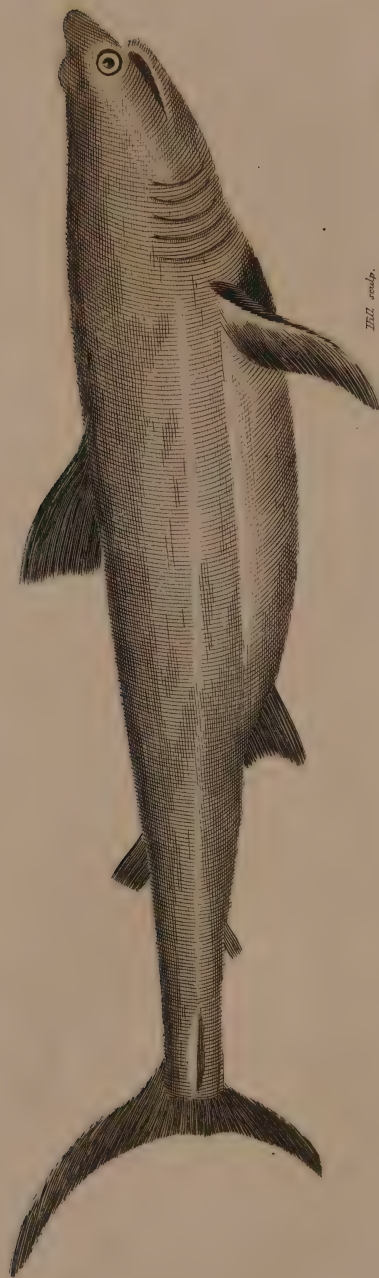
Leaden-Brown Shark, whitish beneath, with small conic-subulate very numerous teeth.

Squalus maximus. S. dentibus conicis, pinna dorsali anteriore majore. Lin. Syst. Nat.

Basking Shark, *Penn. Brit. Zool.*

THIS is a very large species, scarcely, if at all, inferior in size to the white Shark; its length, according to Mr. Pennant, being from three to twelve yards, and even sometimes more. The measurements of one observed by that author on the shore of Loch Ranza in the Isle of Arran were as follow: viz. The whole length twenty-seven feet, four

inches : first dorsal fin three feet : second one foot : pectoral fins four feet : ventral two feet : upper lobe of the tail five feet ; lower three. Great numbers of this species of Shark were observed to visit the bays of Caernarvonshire and Anglesea in the summers of 1756, and a few succeeding years ; continuing there only during the hot months, and quitting the coast about Michaelmas. They appear in the Firth of Clyde, and among the Hebrides in the month of June, in small shoals of seven or eight, but more frequently in pairs ; and depart again in July. “ They had nothing (says Mr. Pennant), of the fierce and voracious nature of other Sharks, and were so tame as to suffer themselves to be stroked : they generally lay motionless on the surface, commonly on their bellies, but sometimes, like tired swimmers, on their backs : their food seemed to consist entirely of sea-plants, no remains of fish being ever discovered in the stomachs of numbers that were cut up, but the half digested parts of Algæ, &c. Linnæus says they feed on Medusæ. At certain times they were seen sporting on the waves, and leaping with vast agility several feet out of the water. They swam very deliberately, with the dorsal fins above the water : their length was from three to twelve yards or more : their form slender, like others of the Shark kind : the upper jaw was much longer than the lower, and blunt at the end : the mouth placed beneath, and each jaw furnished with numbers of small teeth : those before were much bent, those more remote in the jaw were conic and sharp-



BASKING SHARK. *female*

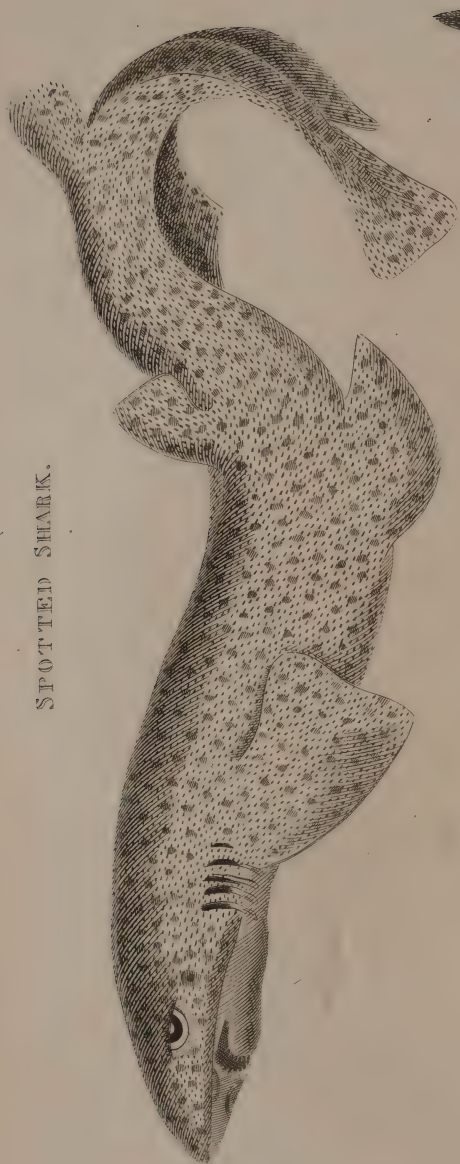
pointed : on the sides of the neck were five large transverse apertures to the gills : on the back were two fins, the first very large, not directly in the middle, but rather nearer the head ; the other small, and situated near the tail : on the lower part were five others, viz. two pectoral fins ; two ventral fins, placed just behind the fin of the back, and a small anal fin : the tail was very large, and the upper part remarkably longer than the lower : the colour of the upper part of the body was a deep leaden, the belly white : the skin was rough, like shagreen, but less so on the belly than the back : within the mouth, towards the throat, was a very short sort of whalebone : the liver was of a great size, but that of the female was the largest : some weighed above a thousand pounds, and yielded a great quantity of pure and sweet oil, fit for lamps, and also much used by the people who took them, to cure bruises, burns, and rheumatic complaints : a large fish has afforded the captors a profit of twenty pounds : they were viviparous, a young one of about a foot in length being found in the belly of a fish of this kind."

Mr. Pennant adds, that a shoal of this species will permit a boat to follow them without accelerating their motion till almost within contact, when it is usual for the harpooner to strike his weapon into them as near the gills as possible ; but that they are often so insensible as not to move till the united strength of two men have forced in the harpoon deeper : as soon as they perceive themselves wounded, they fling up their tail, and plunge

headlong to the bottom, and frequently coil the rope round them in their agonies, attempting to disengage the harpoon from them by rolling on the ground; for it is often found greatly bent. As soon as they discover that their efforts are in vain, they swim away with amazing rapidity, and with such violence, that there has been an instance of a vessel of seventy tons having been towed away against a fresh gale: they sometimes run off with two hundred fathom of line, and with two harpoons in them, and will employ the fishers for twelve, and sometimes for twenty-four hours before they are subdued: when killed, they are either hawled on shore, or, if at a distance from land, to the vessel's side: the liver (the only useful part) is taken out, and marked out, and melted into oil in kettles provided for the purpose. A large fish will yield eight barrels of oil, and two of useless sediment. The fishers observed on these Sharks a sort of leech, of a reddish colour, and about two feet long, but which fell off when the fish was brought to the surface of the water, and left a white mark on the skin.

A male of this species was taken in the year 1801 at Abbotsbury in Dorsetshire, entangled in a fishing-seine, and, after a violent resistance, was dragged ashore. It is said to have received seventeen musket-balls before it expired: its length was twenty-eight feet, and its circumference in the thickest part about twenty feet: its tail, from point to point, near eight feet: the teeth, according to its proprietor, who took the pains to count them, amounted to the number of four thousand.

SPOTTED SHARK.



BLUE SHARK.



Hatch, sculp.

BLUE SHARK.

Squalus Glaucus. S. cæruleus, gracilis, subtus albidus, fronte acuminata.

Blue, slender Shark, whitish beneath, with pointed front.

Squalus glaucus. S. fossula triangulari in extremo dorso, foraminibus nullis ad oculos. Linn. Syst. Nat.

Squalus absque foraminibus ad oculos. Bloch, t. 86.

Blue Shark. *Penn. Brit. Zool.*

OF a more slender and elegant shape than most others of the genus: colour above deep glaucous or blue-green, beneath white: head rather large, with the snout very long and pointed, and the mouth wide, and placed very far beneath: teeth nearly triangular, lengthened, sharp-pointed, and disposed in three or four rows: eyes large: first dorsal fin seated about the middle of the back, the second very near the tail, opposite the anal fin: tail of moderate size, deeply bilobate, with the lower lobe much larger and longer than the upper. This species, which is the most beautiful of all the Sharks, in point of colour, grows to the length of ten, twelve, or even fourteen feet, and is an inhabitant of almost all parts of the globe. It is a very voracious and bold fish, and scarcely less dreaded by sailors than the common or white Shark. It is said principally to prey on herrings, shads, and tunnies; it frequents several of the British coasts, particularly those of Cornwall, during the pilchard-season, and is at that time taken with large iron hooks prepared for the purpose.

TOPE.

Squalus Galeus. S. cinereus, subtus pallidior, fronte acuminata, dentibus subtriangularibus.

Cinereous Shark, paler beneath, with pointed front, and subtriangular teeth.

Squalus Galeus. S. naribus ori vicinis, foraminibus ad oculos. Lin. Syst. Nat.

Milandre. *Broussonet. act. Paris. 1780.*

Tope. *Penn. Brit. Zool.*

THIS species arrives at a considerable size, often measuring several feet in length, though the specimens usually seen about the British coasts scarcely exceed the length of about five feet. In its habits it resembles the white Shark, being a very bold and rapacious fish, attacking such as happen to be accidentally exposed to it with great violence and rapidity: its shape is rather slender; its colour pale cinereous above, and whitish beneath: the nose long, flat, and pointed: the nostrils are situated near the mouth; and behind each eye is a small orifice: the teeth are numerous, disposed in three rows, small, very sharp, triangular, and serrated on their inner edge: the first dorsal fin is placed about the middle of the back, and is rather large: the second is small, and situated near the tail, which is small, and terminates in two unequal lobes, of which the lower is by much the broadest. According to Rondeletius this fish is so bold as to pursue its prey to the very edge of the shore, and to attack those who are walking near the water's side. It

is supposed to be the Canicula of Pliny, which that writer describes as highly dangerous to those employed in diving for corals, sponges, &c.

FOX SHARK.

Squalus Vulpes. S. plumbeus, subtus albidus, capite brevi conico, cauda prælonga.

Lead-coloured Shark, whitish beneath, with short conic head, and very long tail.

Squalus Vulpes. S. caudæ lobo superiore longitudine corporis. Lin. Syst. Nat. Gmel. p. 1496.

Vulpes. Rondel.

Vulpecula. Salv. Will. &c.

Long-tailed Shark. *Penn. Brit. Zool.*

THIS is distinguished by its plump, short, sub-ovate body, and very long, tapering tail: the head is small and pointed: the first dorsal fin triangular, and placed on the middle of the back; the second above the beginning of the tail, which gradually tapers to the tip, and is furnished with a shallow fin or process beneath, running from the base to the tip, which is sharp, and slightly bilobate: the pectoral fins are of considerable size: the eyes large: the mouth small: the teeth triangular, small, and disposed in three rows. The colour of the fish is dusky ash above, and whitish beneath. It grows to the length of more than thirteen feet, the tail measuring more than half the length of the whole animal. It is an inhabitant of the Mediterranean and other seas, and is considered as a voracious and

artful fish, but the name of sea-fox is applied to it rather from the length of its tail than from its character of sagacity.

SPOTTED SHARK.

Squalus Catulus. S. rufescens maculis numerosis parvis nigricantibus, naso subacuminato, pinnis ventralibus connatis.

Reddish Shark, with numerous small blackish spots, somewhat pointed snout, and connate ventral fins.

Squalus Catulus. S. varius, pinnis ventralibus concretis. Bloch. t. 114.

Lesser Spotted Dog-Fish. *Penn. Brit. Zool.*

HABIT rather slender: length from two to three feet: head large: snout prominent, and slightly pointed: skin rough: body cylindric: colour pale brick-red, marked with very numerous, small, rounded, blackish or dusky spots: abdomen whitish: both the dorsal fins placed much nearer to the tail than the head: ventral fins connate, large, and of a slightly pointed form: anal fin small: tail long, bilobate, with the lower lobe continued to a considerable distance beneath. Native of the European seas: a very voracious animal, preying on the smaller fishes, crabs, &c. According to Pennant it breeds from nine to thirteen young at a time, is very numerous on our own coasts, and very injurious to the fisheries: the liver is said to be highly noxious, causing long-continued stupor, succeeded by an universal itching, with a total desquamation of the cuticle.

Egg of Panther Shark.



PANTHERSHARK.

Female?

PANTHER SHARK.

Squalus Canicula. *S. cinereo-rufescens, maculis ocellaribus nigricantibus, capite brevi, naso subacuminato, pinnis ventralibus discretis.*

Cinereo-rufescent Shark, with ocellated blackish spots, short head, slightly pointed snout, and distinct ventral fins.

Squalus Canicula. *S. varius, pinnis ventralibus discretis.* Bloch. t. 112.?

Spotted Dog-Fish. *Penn. Brit. Zool.*

LENGTH from three to four feet: habit rather more slender than that of the preceding fish: head rather small: snout prominent and slightly pointed: body cylindric: skin rough: colour of the whole animal pale brown, with a slight rufous cast, and marked with numerous groupes of blackish or dusky spots, not ill resembling in their form those on the skin of a panther: abdomen whitish, with a slightly silvery cast: both dorsal fins situated at a vast distance from the head: ventral fins separate, and rather broad, with a squarish outline: tail as in the preceding. Native of the European seas, preying on the smaller fishes, crabs, &c. in the same manner as the preceding species, of which it is by some considered as the female.

ROCK SHARK.

Squalus Stellaris. S. cinereo-rufescens, maculis nigricantibus, inæqualibus, lobo utrinque nasali duplici.

Cinereo-rufescent Shark, with unequal blackish spots, and double-lobed nostrils.

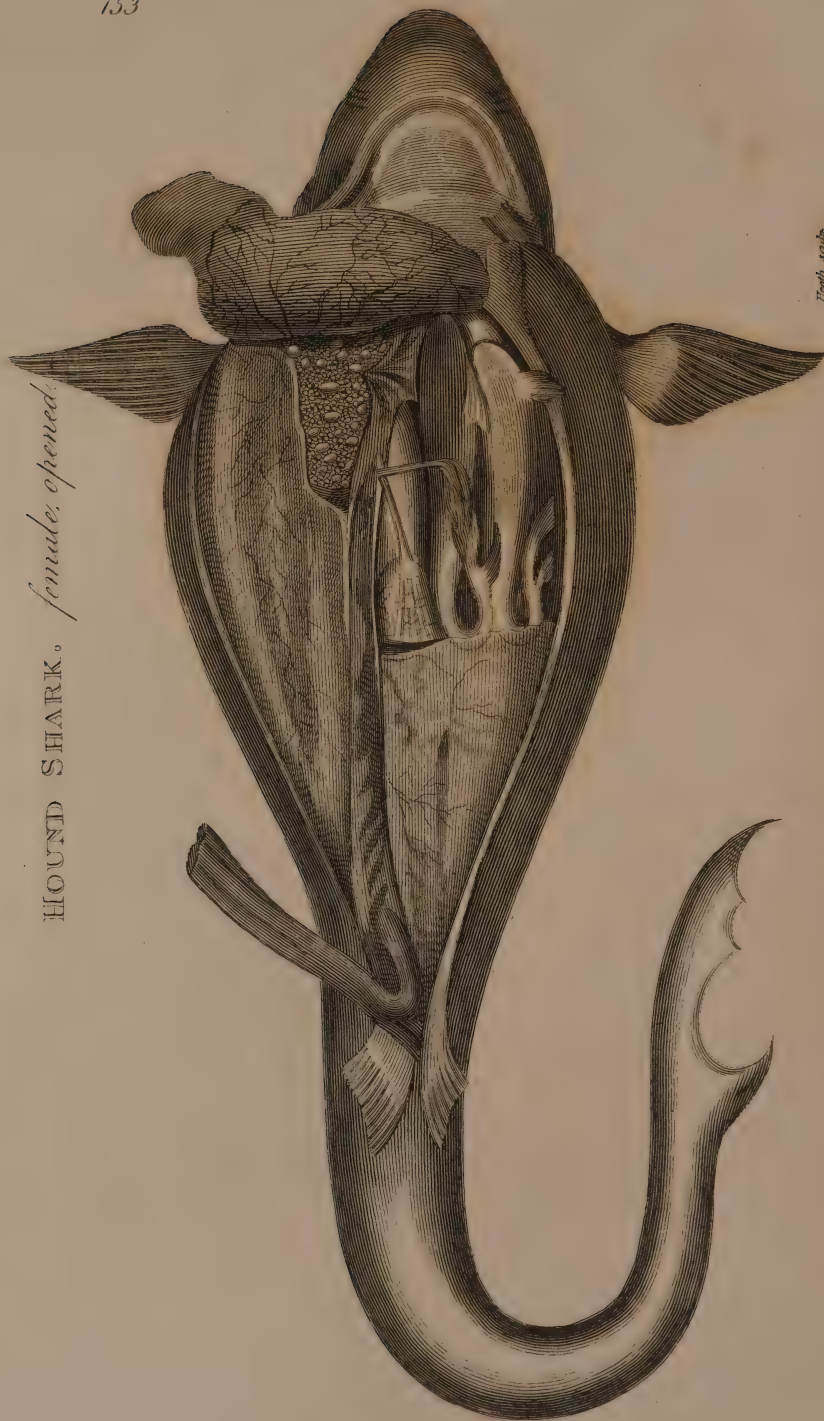
Lé Rochier. *Cepede.*

Catulus maximus. Will. p. 63.

Greater Spotted Dog-Fish. *Penn. Brit. Zool.*

GREATLY allied to the preceding, with which it appears to have been frequently confounded by authors; the male and female differing from each other nearly in the same manner and proportion as in the *Squalus Catulus*, and having a nearly similar disposition of colours. In the present species, which is larger than the preceding, and arrives at the length of six feet, the nostrils are half closed by a pair of lobes, the exterior of which is larger than the interior, and of a roughened surface: the snout is rather more elongated, and the tail somewhat shorter than in the *S. Catulus*: the first dorsal fin is nearer to the extremity of the tail than to the snout: the second, which is nearly of similar size with the first, is placed almost opposite to the anal fin. The general colour of the animal is a reddish-grey, with round, unequal, blackish spots scattered over the whole body, and larger in proportion than in the *Catulus*. The male and female are said to differ as to the disposition of spots in the same manner as in that species. Native of the European seas, generally frequenting

HOUND SHARK. female, opened.



Teeth, scale

rocky places, and preying on various Mollusca and Crustacea: it is much less frequently taken than the preceding species, though said to be more prolific, producing not less than nineteen or twenty young at a time. Its skin is used in commerce for the same purposes as those of other small Sharks, and the flesh is esteemed somewhat more eatable than that of the former species. In Edwards's figure of the young of this fish, the body is represented as barred across the back with several broad brown bands.

HOUND SHARK.

Squalus Mustelus. *S. subfuscus, subtus albidus, dentibus parvis numerosis obtusis, pinnis pectoralibus brevibus.*

Brownish Shark, whitish beneath, with numerous small obtuse teeth, and short pectoral fins.

Squalus Mustelus. *S. dentibus obtusis.* *Lin. Syst. Nat.*

Smooth Hound. *Penn. Brit. Zool.*

HABIT slender: snout slightly sharpened, and lengthened: first dorsal fin large, and placed nearly in the middle of the back: the second nearly opposite the anal fin: tail shaped as in most others of this tribe, or slightly bilobate, the lower lobe continued to some distance beneath: teeth very numerous, small, slightly convex, and set as in the Rays: general colour of the animal greyish brown, paler or white beneath: sometimes varies in being marked above by numerous white spots. The

stomach in this fish is furnished with several appendices situated near the pylorus: it is found both in the European and Indian seas, growing to the length of about two feet.

PICKED SHARK.

Squalus Acanthias. S. fusco-cinereus, subtus albus, dentibus numerosis parvis acutis, pinnis dorsalibus spinosis.

Ash-Brown Shark, white beneath, with numerous small sharp teeth, and spiny dorsal fins.

Squalus Acanthias. S. pinna anali nulla, dorsalibus spinosis, corpore teretiusculo. Lin. Syst. Nat.

Squalus corpore teretiusculo, dorso biaculeato. Bloch. t. 85.

Picked Dog-Fish. *Penn. Brit. Zool.*

Aiguillat. *Broussonet. act. Paris. 1780.*

HABIT similar to that of the *S. Mustelus*, from which it is readily distinguished by a very strong, bony spine, situated before each dorsal fin, and connected at its base with the fin itself: teeth small and sharp, and disposed in rows along the jaws: upper lobe of the tail longer or more projecting than the lower, which is continued to some distance beneath: colour of the whole animal brownish ash above, white beneath: length from three to four feet: inhabits the European seas: very common about the coasts of Scotland, where it is taken in order to be prepared for sale by splitting and drying, and is then much used as a food among the lower orders of the people. Mr. Pennant informs us that it forms a sort of internal commerce, being

carried on women's backs fourteen or sixteen miles up the country, and either sold or exchanged for various necessities.

Molina, in his Natural History of Chili, describes what appears to be a variety of this species, in which the body is marked by ocellated spots, and the spines of the dorsal fins recurved at the tip.

DUSKY SHARK.

Squalus Spinax. *S. fuscus, subtus nigricans, pinnis dorsalibus spinosis.*

Brown Shark, blackish beneath, with spiny dorsal fins.

Squalus Spinax. *S. subtus nigricans. Lin. Gmel.*

Sagre. *Broussonet. act. Paris. 1780.*

Galeus Acanthias sive Spinax fuscus. *Will. p. 57.*

GREATLY allied to the preceding, with which it has been often confounded; but differs in being of a much darker colour, with the singular circumstance of the abdomen being still darker than the upper parts, or nearly black: back broader than in the preceding fish: dorsal fin spined in the same manner. Native of the European seas.

CENTRINA SHARK.

Squalus Centrina. *S. fuscus, subtus pallidior, corpore subtrigono, pinnis dorsalibus spinosis.*

Brown Shark, paler beneath, with subtrigonal body, and spiny dorsal fins.

Squalus Centrina. *S. pinna anali nulla, dorsalibus spinosis, corpore subtriangulari.* *Lin. Syst. Nat.*

Centrina. *Gesn. Salv. Aldr. Will. &c.*

Squalus unica serie dentium incisorum in maxilla inferiore. *Bloch. t. 115.*

LENGTH from three to four feet: habit thick and short: body of a somewhat triangular shape, the sides shelving down from the back, and the abdomen being flattish: head somewhat small: snout blunt: in the upper jaw three rows of teeth, in the lower a single row; all rather slender and sharp-pointed: first dorsal fin very large, commencing at a small distance from the head, subtriangular, and furnished in front with a strong and sharp spine projecting through the skin at some distance from the tip, and pointing rather forwards than backwards: second dorsal fin much smaller, situated near the tail, and furnished with a similar spine, but pointing backwards: tail rather small, short, and obscurely bilobate: colour dusky brown, paler beneath: skin rough, and beset with tubercles: native of the European seas, but a rare species in comparison with many others of the genus.



Centrina arrip.

CENTRINA SHARK

PHILIPPIN SHARK.

Squalus Philippinus. *S. fuscus, subtus albidus, capite utrinque lobo elongato.*

Brown Shark, whitish beneath, with a lengthened lobe on each side of the head.

Squale Phillip. *Cepede.*

HABIT slender: colour brown above, whitish beneath: near each eye an appendicle or skinny projection, equalling near an eighteenth part of the whole length of the animal: mouth wide, and paved with sharp teeth disposed in ten or eleven rows: some of the teeth are rather rounded than pointed: before each of the dorsal fins a very strong and sharp spine: anal fin placed at an equal distance from the ventral fins and the tail, which is bilobate, the upper lobe projecting beyond the lower: inhabits the Southern Pacific Ocean: observed during the voyage of Capt. Phillips to Botany-Bay. The individual described in the above-mentioned voyage measured about two feet in length.

PEARLY SHARK.

Squalus Cinereus. *S. griseo-perlaceus, dentibus magnis, compressis, acutis, distinctis.*

Pearly-grey Shark, with large, compressed, sharp, separate teeth.

Squalus cinereus. *S. spiraculis utrinque septem, Lin. Gmel.*
Perlon, *Cepede,*

ALLIED to the Blue Shark: length about three feet: colour pearly grey: skin less rough than in the Blue Shark: eyes large: teeth large, compressed, sharp, and separate: spiracles large: dorsal fin single, situated in the middle of the back, and larger than the anal: tail bilobate. Native of the Mediterranean: described in the Memoirs of the French Academy by Broussonet, from a specimen preserved in the British Museum.

SPINY SHARK.

Squalus Spinosus. *S. griseo-fuscus, subtus albidus, corpore tuberculis mucronatis inæqualibus sparsis muricato.*

Grey-Brown Shark, whitish beneath, with the body roughened by unequal scattered sharp-pointed tubercles.

Squale bouclé. Cepede.

LENGTH about four feet: colour grey-brown above, whitish beneath: body roughened with scattered, unequal tubercles, consisting of a broad, round base and curved, sharp-pointed tip, in some bifid: eyes large: snout prominent and conic:

gape moderate: teeth of a squarish shape, compressed, cornered at the margins, and placed in several rows: dorsal fins placed near the tail: the first opposite the ventral, which are set at an unusual distance from the head, and are almost as large as the pectoral: tail angular. Described by Broussonet from a specimen in the Paris Museum. Native regions uncertain.

 ISABELLA SHARK.

Squalus Isabella. *S. subflavescens, dentibus compressis brevibus triangularibus basi lobatis.*

Yellowish Shark, with short compressed triangular teeth lobed at the base.

Squalus Isabella. *S. pinna dorsali prima abdominalibus opposita.*
Lin. Gmel. Brouss. act. Par. 1780.

ALLIED in point of habit to the *S. Canicula*, but with a broader head, and an obtuse snout: length of the specimen observed, about two feet and a half: colour as mentioned in the specific character: teeth compressed, short, triangular, furnished on each side the base with an accessorial or smaller lobe, and disposed in six rows: tongue very short and thick: dorsal fin subquadrangular; the second placed opposite the anal fin: pectoral fins very large: ventral separate, and pointed behind. Native of the Southern Pacific, and observed about the coasts of New Zealand, during the voyage of Sir Joseph Banks: described by Broussonet from the MSS. of Dr. Solander.

CIRRHATED SHARK.

Squalus Cirratus. *S. rufus, squamosus, narium appendice vermiformi.*

Rufous Shark, with a worm-shaped appendix at the nostrils.

Squalus cirratus. *S. narium appendice vermiformi.* *Lin. Gmel.*
Brouss. act. Paris. 1780.

ALLIED in habit to the *Canicula*: length from one to five feet: colour rufous, in the young spotted with black: skin covered with moderately large, flat, shining scales: eyes very small: teeth numerous, sharp, and dilated at the base: first dorsal fin opposite the ventral; the second opposite the anal: tail about a fourth of the length of the whole animal, and terminating in a bilobate fin. Native of the American and Indian seas.

 BEARDED SHARK.

Squalus Barbatus. *S. griseus maculis nigris albo marginatis, ore appendicibus vermiformibus barbato.*

Grey Shark, with black spots edged with white, and the mouth bearded with worm-shaped appendices.

Squalus barbatus. *S. rictu oris appendicibus vermiformibus barbato.* *Lin. Gmel. Brouss. act. Paris. 1780.*

LENGTH about three feet and a half: colour greyish: skin covered by minute, hard, shining scales, and variegated with black, rounded, and angular spots with whitish margins: head large, depressed, and smooth: teeth lanceolate, and placed in several rows: beards about half an inch

long, and subdivided or ramified. Native of the Southern Pacific: observed about the coasts of New Holland.

STRIPED SHARK.

Squalus Africanus. *S. griseus, fasciis septem longitudinalibus nigricantibus.*

Grey Shark, with seven longitudinal blackish bands.

Squalus Africanus. *S. fasciis septem nigricantibus parallelis longitudinalibus pictus.* Lin. Gmel. Brouss. act. Par. 1780.

LENGTH about two feet and a half: skin covered by minute, squarish scales: head rather broader than the body, and depressed: mouth semicircular: teeth compressed, elongated, sharp, and disposed in rows, which are transverse in the upper, and oblique in the lower jaw: palate and tongue covered with soft, unequal, scattered tubercles: pectoral fins horizontal: ventral subtriangular, and oblique at the tips: anal oblong, rounded in front, and pointed behind: first dorsal fin situated beyond the middle of the back; the second opposite the hind part of the anal: tail rounded: described by Broussonet: native of the African seas.

OCELLATED SHARK.

Squalus Ocellatus. S. subfasciatus, fusco-maculatus, ocello utrinque nigro supra pinnas pectorales.

Subfasciated Shark, with dusky spots, and a black ocellate spot on each side above the pectoral fins. *Nat. Misc. t. 161.*

Squalus ocellatus. S. litura magna rotunda nigra, circulo albo cincta, ad utrumque colli latus. Lin. Syst. Nat. Gmel. Brouss. act. Par. 1780.

LENGTH about two feet and a half: colour ash-brown, with a few scattered dusky spots; back crossed by a few dusky bands: abdomen greenish grey: teeth numerous, small, sharp, compressed, and dilated at the base: pectoral fins rounded, and of a dusky or blackish colour, edged with white: first dorsal fin situated beyond the ventral, marked at its anterior edge with two black spots, and emarginated behind: second of similar shape, but smaller: anal fin placed very near the tail, which is slightly sublobate. Native of the Southern Pacific: observed about the coasts of New Holland during the first voyage of Sir Joseph Banks.

 GREY SHARK.

Squalus Griseus. S. spiraculis utrinque sex, Lin. Gmel. Brouss. act. Par. 1780.

Grey Shark, with six spiracles on each side.

LENGTH two feet and a half: colour pale brown: skin slightly rough, and covered with very small scales, each marked by a carina: head small, de-

pressed, and obtuse: gape wide: in the lower jaw several rows of very large, compressed, squarish, serrated teeth: in the upper jaw a single row of similar teeth on each side, and in front many smaller simple ones, of a narrower and sharper form than the others: dorsal fin single: pectoral fins horizontal: anal small, and situated midway between the ventral and tail. Native of the Mediterranean: described by Broussonet.

AMERICAN SHARK.

Squalus Americanus. S. pinnis dorsalibus inermibus, posteriore majore, ventralibus magnis caudæ proximis. Lin. Gmel. Brouss. act. Par. 1780.

Shark with unarmed dorsal fins, of which the hindermost is the largest, and large ventral fins situated near the tail.

LENGTH about three feet: skin rough: scales small and angular: body cylindric: head large: snout short, and obtuse: teeth oblong, sharp, compressed, and disposed in several rows; the largest serrated on the edges: eyes large: first dorsal fin placed before the middle of the body; the other rather beyond the anal: pectoral fins suboval; tail lanceolate. Native of the American seas: described by Broussonet.

SCALY SHARK.

Squalus Squamosus. *S. squamis ovatis carinatis, pinnis dorsali-
bus spinosis, dentibus subquadratis, inferioribus majoribus.*

Shark with ovate carinated scales, spiny dorsal fins, and
squamish teeth, largest in the lower jaw.

Squale eccailleux. *Cepede.*

ALLIED to the *S. Centrina*, but covered with pretty conspicuous ovate scales, of somewhat unequal size, and marked by a middle carina: length about three feet: eyes oblong: snout oblong, depressed: gape moderate: teeth squarish, with angular margins: dorsal fins oblong, occupying the greatest part of the back, and furnished with a spiny ray in the middle: the first dorsal fin is the largest; the second narrower and longer: the pectoral fins are middle-sized, and narrowed towards the base: the ventral semi-ovate, and placed near the caudal, which is rounded at the beginning, and dilated towards the tip. Native regions uncertain.

PORBEAGLE SHARK.

Squalus Cornubicus. *S. corpore crasso tereti, rostro conico prominente, cauda lunata.*

Shark with thick round body, prominent conic snout, and lunated tail.

Squalus Cornubicus. *S. plica longitudinali ad utrumque caudæ latus.* *Lin. Gmel.*

Porbeagle Shark. *Penn. Brit. Zool. Borl. Cornw.*

THIS species is slightly described by Mr. Pen-
nant, in the British Zoology, from an engraving in
Borlase's History of Cornwall, which was copied
from a drawing by the Revd. Mr. Jago, Minister
of Loo in Cornwall, and who appears to have been
a very observant and skilful ichthyologist; since
many of his communications are preserved in the
works of Ray and Petiver.

A specimen observed in the year 1793, by the
Revd. Dr. Goodenough, on the coast of Hastings,
is described in the third volume of the Linnæan
Transactions. Its length, from the tip of the snout
to the extremity of the tail, was three feet ten
inches: the colour of the body a deep blue on the
back, and white or silvery beneath: the shape was
round, except for about six inches from the tail,
where it was depressed: at about an inch from the
tail was a semicircular or lunar fossule or impres-
sion, the points of which were towards the tail:
where the body was depressed the sides were raised
into a sharp angle or elevated line of about eight
inches in length, running into the middle of the
tail or a little beyond: the nose was prominent

and sharp; and on either side, from the nose to the eyes were numerous perforations or minute pores: the tail was of a lunar form, the upper lobe nearly a third longer than the lower. From the number of teeth, which were two rows in each jaw, the fishermen concluded it to be two years old, and Dr. Goodenough was assured that they had been seen of the length of eight feet, with three rows of teeth.

BEAUMARIS SHARK.

Squalus Monensis. S. corpore crasso tereti, rostro subconico, cauda lunata.

Shark with thick round body, subconical snout, and lunated tail.

Beaumaris Shark. *Penn. Brit. Zool.*

OBSERVED by the Revd. Hugh Davies of Beaumaris, in the Isle of Anglesea, who communicated its description to Mr. Pennant. The length was seven feet: the snout and body of a cylindric form: the greatest circumference four feet eight inches: the nose blunt: nostrils small: mouth armed with three rows of slender teeth, flattened on each side, very sharp, and furnished at the base with two sharp processes: the first dorsal fin was two feet distant from the snout, and of a triangular form: the second very small, and placed near the tail: the pectoral fins strong and large: the ventral and anal small: the space between the second dorsal and the tail much depressed, the sides forming an

acute angle: above and below was a transverse fossule or dent: the tail was of the form of a crescent, but the horns of unequal length; the upper* being thirteen inches, the lower ten: the whole fish was of a leaden colour, and the skin comparatively smooth, being far less rough than in most of the genus. This and the preceding fish seem very nearly allied, and perhaps may only constitute sexual differences of the same species.

DENTICULATED SHARK.

Squalus Denticulatus. S. griseus, supra maculis magnis inaequalibus rufis, dorso elevato tuberculis denticulato.

Grey Shark, marked above with large unequal rufous spots, with elevated back denticulated by tubercles.

Squale dentelé. Cope.

COLOUR greyish or pale ash-brown, marked over the whole upper part with large, irregular, rufous spots: back much elevated, and appearing denticulated by a row of small tubercles, running from between the eyes to the first dorsal fin: all the fins, except the caudal, tipped with brown: first dorsal fin placed beyond the middle of the back: tail bilobate, the upper lobe longer than the lower, and indented by a partial division: teeth triangular: size not mentioned: described by Cope from a dried specimen in the Prince of Orange's Museum.

* In the British Zoology the upper lobe is said to be ten, and the lower thirteen inches long; but it is clear from the plate, engraved from Mr. Davies's drawing, that this is an error.

PUNCTULATED SHARK.

Squalus Punctulatus. *S. supra rufus albo punctatus, subtus ferrugineus.*

Shark with the upper parts rufous, speckled with white, the lower parts ferruginous.

Squale pointillé. Cepede.

HABIT similar to that of the Isabella Shark: colour rufous above, deep tawny beneath: upper parts marked with numerous, small, white specks: head rounded in front: teeth similar to those of the *Canicula*: spiracles small: pectoral fins rather large: tail deeply lobed. Native of the American seas: described by Cepede, but the size not particularized.

ZEBRA SHARK.

Squalus Zebra. *S. fuscus, rivulis transversis lacteis.*

Brown Shark, with transverse milk-white undulations.

Squalus tigrinus. *S. cauda elongata, spiraculis duobus postremis confluentibus.* *Lin. Syst. Nat. Gmel.*

Squalus varius, &c. *Seb. mus. 3. t. 34. f. 1.*

Squalus fasciatus. *Bloch, t. 113.*

THE most elegant of the whole genus, being of a dark brown colour, beautifully barred with broad, milk-white, transverse, and somewhat undulating stripes, between which are here and there interspersed a few oval spots of similar colour: fins marked in the same manner: head large and rounded: mouth furnished with a pair of worm-like

beards or cirrhi: habit similar to that of *Canicula* and some others, but with the body shorter, and the tail longer in proportion: pectoral fins large: both the dorsal rather small: tail finned to a great distance beneath the tip, which is of an ovate shape. Native of the Indian seas, growing to the length of fifteen feet: said to feed chiefly on testaceous and crustaceous marine animals. Sometimes the variegations are rather of a pale rufous cast than white. First described by Artedi, from a specimen in the collection of Seba, in the third volume of whose *Thesaurus* it is elegantly figured.

GRONOVIAN SHARK.

Squalus Gronovianus. *S. griseus, supra nigro maculatus, rostro rotundato.*

Grey Shark, spotted above with black, and with rounded snout.

Squalus Indicus. *S. dorso vario inermi, dentibus acutis.* Lin. Gmel. *Gron. Mus.* 1. n. 133.

COLOUR grey, with the head and back spotted with black: dorsal fins nearer the tail than the ventral ones, and very distant from each other: snout rounded: teeth sharp, and placed in seven rows in both jaws: tail consisting of an undivided lobe: native of the Indian seas: described by Gronovius: size not mentioned.

With dilated head.

HAMMER-HEADED SHARK.

Squalus Zygæna. S. capite transverso latissimo.

Shark with very broad transverse head.

Squalus Zygæna. S. capite latissimo transverso malleiformi.

Lin. Syst. Nat.

Zygæna. Rondel. Gesn. Aldr. Will. &c.

Squalus capite malleiformi. Bloch. t. 117.

PERHAPS the most deformed of all the marine animals: length from five to fifteen or seventeen feet: habit rather slender: body subcylindric: head dilated on each side to a great extent: the eyes, which are very large, being placed at each extremity: mouth beneath, as in other Sharks; teeth sharp, denticulated on each side, and disposed in three rows in each jaw: first dorsal fin rather large, of a somewhat falcated shape, and placed towards the upper part of the back: the second much smaller, and situated near the tail, which is rather short than long, and lobed beneath, the fin running on nearly as far as the vent: colour brown above, paler or whitish beneath. Native of the Mediterranean and Indian seas, where it is scarcely less voracious and formidable than even the White Shark itself; attacking such as are accidentally exposed to its fury, or are incautiously bathing or swimming in its neighbourhood. It is observed about the coasts of the Southern Islands, and particularly of Otaheitee, where the natives, trusting to their dexterity in swimming, appear to hold it

HEART-HEADED SHARK.



HAMMER-HEADED SHARK.

in but little dread, since, according to the account of a gentleman on whose veracity I may safely depend, they bathe without apprehension in places known to be infested by it, and by their example have frequently excited a similar boldness in our own countrymen, insomuch that a ship's crew has bathed alongside the vessel for many evenings together. This fish is said to produce about ten or fourteen young at a birth.

HEART-HEADED SHARK.

Squalus Tiburo. S. capite latissimo cordato. Lin. Syst. Nat.

Shark with very broad heart-shaped head.

Tiburonis species minor. Marcgr. Bras. p. 181.

Zygænæ affinis capite triangulo. Will. ichth. p. 55.

Pantouflier. *Brouss. act. Paris. 1780.*

GREATLY allied to the preceding, but a much rarer species: said to grow nearly to the same size: inhabits chiefly the South-American seas: sometimes, though very seldom, observed in those of Europe: first described by Marcgrave in his History of Brasil.

With rounded head.

ANGEL SHARK.

Squalus Squatina. S. capite rotundato, ore terminali, nasibus cirrosis, pinnis pectoralibus maximis.

Shark with rounded head, terminal mouth, bearded nostrils, and very large pectoral fins.

Squalus Squatina. S. pinna anali nulla, caudæ duabus, ore terminali, naribus cirrosis. Lin. Syst. Nat.

Squalus corpore depresso. Bloch. t. 116.

Squatina. Gesn. Rondel. Will. &c.

Angel-Fish. *Penn. Brit. Zool.*

HEAD large, flat, and rounded in front: mouth placed at the end of the head: teeth broad at their base, but slender and very sharp towards the end, and disposed in five rows all round the jaws: tongue large: eyes small, and of a pale green colour: body rather thick, but tapering towards the tail: pectoral fins very large, of a subquadrangular shape, and bearing some distant resemblance to a pair of wings, pectoral fins very large also, and of a shape not greatly dissimilar: dorsal fins very small, and situated pretty near each other at the end of the back: tail broad and lobated: whole body covered by a rough skin, and marked down the back by a prickly, tuberculated line: colour pale ash-brown above, whitish beneath. Native of the European seas, growing to a very large size, measuring from six to eight feet or more in length: extremely voracious, fierce, and dangerous. It chiefly frequenting

ANGEL SHARK. *side view.*



W. L. G. engr.

ANGEL SHARK. *back view.*

the coasts, and feeding on flat-fish, &c. and is sometimes observed in small shoals. It produces twelve or thirteen young at a birth.

With serrated snout.

SAW-SNOURED SHARK.

Squalus Pristis. S. rostro ensiformi osseo plano, utrinque dentato, dentibus æqualibus.

Shark with sword-shaped bony snout denticulated on both sides with equal teeth.

Squalus Pristis. S. pinna ani nulla, rostro ensiformi osseo plano utrinque dentato. Lin. Syst. Nat.

Serra. *Plin. hist. mund. l. 9. c. 2.*

Pristis s. Serra. Rond. Gesn. Aldr. Will. &c.

THE Saw-Fish is a large species of Shark, growing to the length of fifteen feet or more: the head is slightly flattened at the top, and is produced in front into a very long, flat, strait, and slightly tapering bony snout, covered, like the rest of the animal, by minute scales: along the edges project a great number of very strong, large, slightly flattened, and very sharp-pointed tooth-like processes: the mouth, as in other Sharks, is placed beneath, and is furnished on the edges of the jaws with several rows of small and somewhat blunt teeth, paving the lips, as in some of the Rays. The habit of the fish is rather slender; the body convex above, and somewhat flattened beneath: the dorsal fins placed as in the *Squalus Acanthias* and several others: the ventral situated nearly beneath the first dorsal;

and the tail shaped as in other slender-bodied Sharks, with the upper lobe longer or more produced than the lower: the colour of the animal is grey-brown above, paler beneath: the general length of the snout is almost a third of the whole fish, and the number of teeth or processes on each side varies from eighteen to twenty-four. The Saw-Fish is an inhabitant of the Mediterranean and Northern seas, and was known to the ancient writers by the title of *Pristis*. In the embryo animal the edges of the snout are observed to be nearly smooth, or but slightly undulated by the projection of the incipient teeth or processes, which are supposed to be of very quick growth.

In the second volume of the Transactions of the Linnæan Society we find a description, by the ingenious Mr. Latham, of three varieties or differences in the snout of the Saw-Fish or *Pristis*, which he considers as constituting so many distinct species. In the first of these the teeth are more numerous than in the *Pristis Antiquorum* or common Sawfish, as well as of a much narrower and sharper shape: their number is thirty-one or thirty-two on each side, those towards the base being situated more distant from each other than those towards the tip. This kind Mr. L. names *P. pectinatus*. In the second the snout is of a more slender form than in the common Swordfish, the teeth shorter, smaller, flat, and sharp-pointed: they are twenty-eight in number on each side: this he names *P. cuspidatus*. The third has the snout of nearly similar proportions to that of the common

Sawfish, and the teeth only seventeen in number on each side: they are also very short, projecting but a very little way beyond the edge of the snout. This supposed species is described from a complete specimen of the animal, preserved in the Leverian Museum: the total length of the specimen is twenty-eight inches, the snout measuring ten. Mr. L. terms this *P. microdon*.

TENTACULATED SHARK.

Squalus Tentaculatus. S. rostro utrinque tentaculato, spinoso, spinis longioribus brevioribusque intermediis.

Shark with serrated snout tentaculated on each side, with short teeth interposed between the longer ones.

Squalus cirratus. S. rostro cirrato, spinis longioribus; brevioribusque intermediis. Lath. Lin. Trans. 2. p. 281.

THIS rare and curious species constitutes one of the numerous zoological acquisitions obtained by our late voyages to the Southern Hemisphere, having been discovered about the coasts of New-Holland, &c. The specimens hitherto observed have not exceeded the length of about three feet and a half, but it is probable that the animal grows to a far larger size, and indeed this is evident from a snout preserved in the British Museum. In its general shape this fish resembles the rest of the slender Sharks, and is of a pale brown colour above, and whitish beneath: the head is shaped like that of the common Sawfish, but the snout is more slender in proportion: the teeth or processes are very numerous, of unequal size, and are disposed

along the edges in a singular manner; three or four or more of the smaller ones being interposed between each of the larger and longer ones: the total number on each side is not less than ninety-two or ninety-three: a row of small and distant spines also runs along the under part of the edges: at about the middle of the snout beneath, from each side, springs a long and flexible tentaculum or feeler, of a flattened shape, gradually tapering to the tip, and appearing covered entirely, if closely inspected, by minute scales of similar structure to those with which every other part of the skin is clothed: these scales are of a somewhat triangular shape, of a lucid surface, and marked by a small carina or midrib: the mouth is placed beneath the head, as in other Sharks, and the teeth, which are of moderate size, subtriangular, and sharp-pointed, are disposed in five rows in each jaw: the dorsal, pectoral, and ventral fins are disposed as in most of the slender-bodied Sharks, and the tail is of similar structure, viz. slightly bilobate at the tip, the fin or lobe being broader and continued to a greater distance beneath than above.

SEMISAGITTATED SHARK.

*Squalus Semisagittatus. S. rostro ensiformi plano utrinque
dentato denticulis semisagittatis.*

Shark with flat sword-shaped snout denticulated on both sides
with semisagittated teeth.

Yahla. *Russ. ind. t. 13.*

I AM induced to consider this fish as a distinct species, from the remarkable circumstance announced in the specific character. The length of the specimen observed by Dr. Russel was about thirty-four inches, of which the snout measured something more than seven inches: the general shape of the animal is similar to that of the preceding species; the back and sides are convex, and the belly flat: the mouth furnished with numerous granular teeth: the number of spines or processes on the snout is about twenty-six on each side: every tooth or process being semisagittated, or pretty deeply denticulated on one side, viz. that towards the back of the fish. Native of the Indian seas.

I may here observe that these long-snouted Sharks seem considerably allied to the long-bodied Rays, such as the *R. Rhinobatos*, &c. and may be said in some degree to connect the two genera of *Squalus* and *Raja*.

SPATULARIA. SPATULARIA.

Generic Character.

<i>Habitus</i> Squali.	<i>Habit</i> that of a Shark.
<i>Spiraculum</i> utrinque unicum ad latera colli, operculo magno tectum.	<i>Spiracles</i> single on each side the neck, concealed by a large gill-cover.
<i>Rostrum</i> productum, spatulatum.	<i>Snout</i> produced, spatule-shaped.
<i>Os</i> sub capite, amplum, dentibus acutis serratis.	<i>Mouth</i> beneath the head, large, and furnished with sharp, serrated teeth.

RETICULATED SPATULARIA.

Spatularia Reticulata. *S. rostro reticulato.*

Spatularia with reticulated snout.

Polyodon feuille. *Cepede.*

Chien de mer feuille. *Bonaterre encyclop. methodique.*

THIS remarkable fish, the only species hitherto discovered, is greatly allied to the Sharks in its general appearance, and more particularly to those constituting the Saw-Fish tribe; but differs essentially from the genus *Squalus* in having only a single spiracle on each side the neck: this spiracle is very large, and covered by a large, soft and pointed operculum, which, on being raised, exhibits the gills consisting of five cartilaginous laminæ with

*Simmeria rubra*

RETTICULATED SPATULARIA.

1804, June 1 London. Published by G. Kearsley Fleet Street.

fringed edges, as in the generality of fishes: the body is moderately slender, subcylindric, and tapering towards the tail: the head is terminated by a very long, flat, and thin snout, nearly equalling the length of the whole remainder of the animal: it is perfectly even on the edges, gradually dilated towards the tip, and of a form not ill resembling that of a spatula: the upper surface of this part is divided by a longitudinal midrib or carina, while the space on each side is marked with numerous, slightly prominent lines or fibres, forming a kind of reticular and somewhat stellated pattern: the eyes are rather small: the mouth wide, placed beneath the head, and furnished in the upper jaw with a double, and in the lower with a single row of sharp, curved, and serrated teeth: the skin on the whole body, so far as can be judged from small specimens preserved in spirits, is smooth, and destitute of visible scales: the colour is uncertain, but the gill-covers appear marked with numerous spots of a paler cast than the rest of the skin: the lateral line is strongly marked, and runs in a strait direction from the gills to the tail, which is large and strongly lunated: the dorsal fin is single, of moderate size, of a somewhat falcated shape, and placed rather beyond the middle of the back: the pectoral and ventral rather small, and the anal large. The internal parts of this fish, according to the Count de Ceppe, who professes to have examined a young specimen, exhibit nothing very remarkable, except a pretty large air-bladder, which proves this genus to be in reality more nearly allied

to the Sturgeons than to the Sharks. The particular history of the animal is at present unknown, and we are even unacquainted with its usual residence: it is probable however that it is found in the Indian seas: the size of the young specimens observed by Cepede scarce exceeded the length of a foot, the snout alone measuring nearly half: in the British Museum is a specimen of this part measuring about fifteen inches in length, and it is probable that the fish, at its full growth, is of very considerable size.



SOUTHERN CHIMÆRA.



Reverse view.

NORTHERN CHIMÆRA.

CHIMÆRA. CHIMÆRA.

Generic Character.

<i>Caput supra acuminatum.</i>	<i>Head pointed on the upper part.</i>
<i>Os sub capite, labio superiore quinquepartito.</i>	<i>Mouth placed beneath, with the upper lip five-cleft.</i>
<i>Dentes primores incisores bini supra infraque.</i>	<i>Cutting Teeth two in front, both above and below.</i>

NORTHERN CHIMÆRA.

Chimæra Borealis. C. argentea, supra fusco variata, rostro plicato poroso.

Silvery Chimæra, varied above with brown, with pleated porous snout.

Chimæra monstrosa. C. rostro subtus plicis pertusis. Lin. Syst. Nat.

Genus Galei. *Clus. exot.*

Simia marina. Gesn. p. 877. Jonst. pisc. t. 44. f. 2.

Chimæra cauda filiformi. Bloch. t. 124.

THIS fish, so remarkable for the singularity of its appearance, is a native of the Northern ocean, where it generally inhabits the deepest recesses, and is supposed to prey on the smaller kind of fishes, as well as on various sorts of Mollusca and Testacea: its general length is from three to four feet: the body is of a lengthened shape, compressed, and gradually tapering towards the tail, which is con-

tinued into a long and slender filament: the head is very large and thick, rising up in front into a conical or pyramidal form; and at some distance beyond this, on the top of the head, in the male fish, is a short upright process with a fringed or subdivided tip, resembling a tuft: the mouth is placed beneath, and is of moderate width, and furnished in each jaw with a pair of broad, bony laminæ, notched at the margin into a resemblance of numerous teeth; while in front, both above and below, stand two large, subtriangular, flattish cutting-teeth: the upper lip is divided above into five clefts, and the front, from the mouth to the eyes, is marked by transverse undulations and pores, in such a manner as to resemble a kind of embroidery: a line of this kind runs across the forehead, beneath the point or tip, and is continued in a serpentine course into the lateral line, after sending up a side-branch beyond the eyes, and back again towards the nostril on each side: the intervening space between these lines is filled up by numerous, distinct pores: the lateral line is very strongly marked, of a whitish colour with dark edges, and runs strait from the place before-mentioned to the tip of the tail: the eyes are very large, placed on each side the head, and are of a greenish colour with silvery irides: in the living fish they are said to shine with a phosphoric splendour: the whole body is of a yellowish brown above the lateral line, and of a bright silver-colour beneath it, variegated, more particularly above the lateral line, with numerous, irregular deep-brown or blackish

spots and patches: the fins are yellowish brown, varied with darker shades: the first dorsal fin is triangular, and furnished at its origin with an extremely strong and sharp spine, projecting somewhat beyond the finny part: the second dorsal fin commences at a small distance beyond the first, and is shallow, soft-rayed, and continued to a great distance: the third, which is of similar appearance, commences immediately after this, and is continued to the end of the tail, being gradually lost in the terminal filament: the pectoral fins, which are very large, and of a subtriangular shape, are situated beneath the first dorsal: the ventral are of similar shape, but much smaller, and placed at about the middle distance from the head to the end of the tail: at the base of each, in the male, is a lengthened, subcylindric process, roughened by numerous sharp prominences in a reversed direction: these organs, as appears from the examination of Dr. Bloch, are analogous to the lengthened processes observed in the males of Sharks and Rays.

The Chimæra is observed seldom to approach the shores, except during the breeding-season; it is also said to swim chiefly by night, and to prey on young herrings, cod, and other smaller fishes. Its flesh is considered as coarse and uneatable, resembling that of most of the Shark tribe, but the Norwegians are said to use the eggs in the composition of their pastry; and from the liver is drained an oil, which is considered as of singular efficacy in disorders of the eyes, and as an embrocation for bruises and wounds; while the long process

or filament at the end of the tail is dried and used for the purpose of a pipe-cleaner.

From the Linnæan title of this fish, both generic and specific, we might be led to imagine it one of the most deformed and monstrous of all the inhabitants of the deep: its appearance however, on the whole, is rather grotesque than formidable, and its colours highly elegant. I have sometimes thought it not improbable that the Bishop-Fish, described and figured in the works of Rondeletius, may have taken its rise from distorted preparations of the upper part of this animal, with the addition of some other articles to form the lower part.

SOUTHERN CHIMÆRA.

Chimæra Australis. *C. subargentea, rostro subtus labro inflexo levi.*

Subargenteous Chimæra, with the snout produced beneath into an inflected lip.

Chimæra Callorhynchus. *C. rostro subtus labro inflexo levi.*
Lin. Syst. Nat.

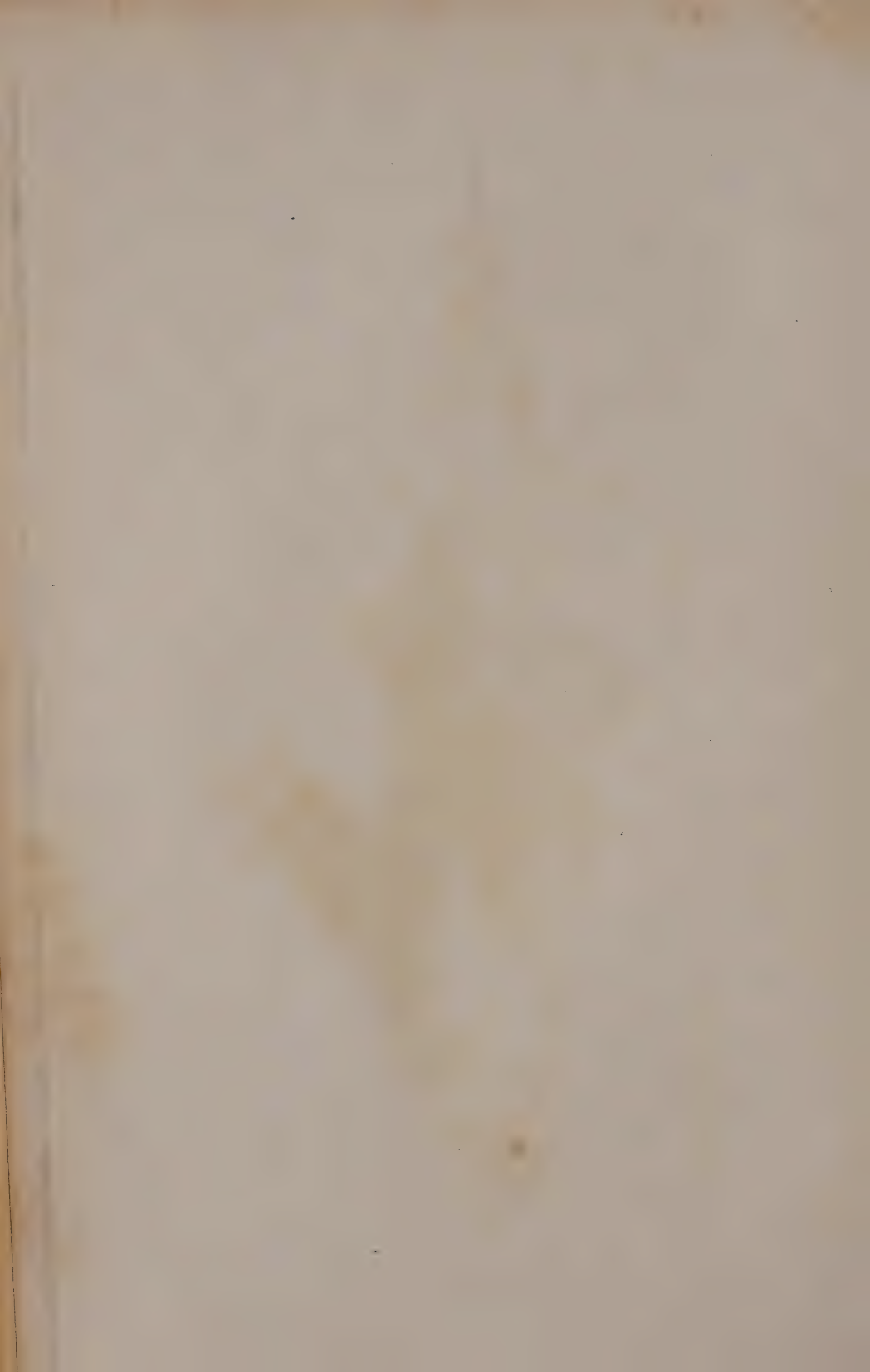
Callorynchos. *Gronov. mus. 59. t. 4.*

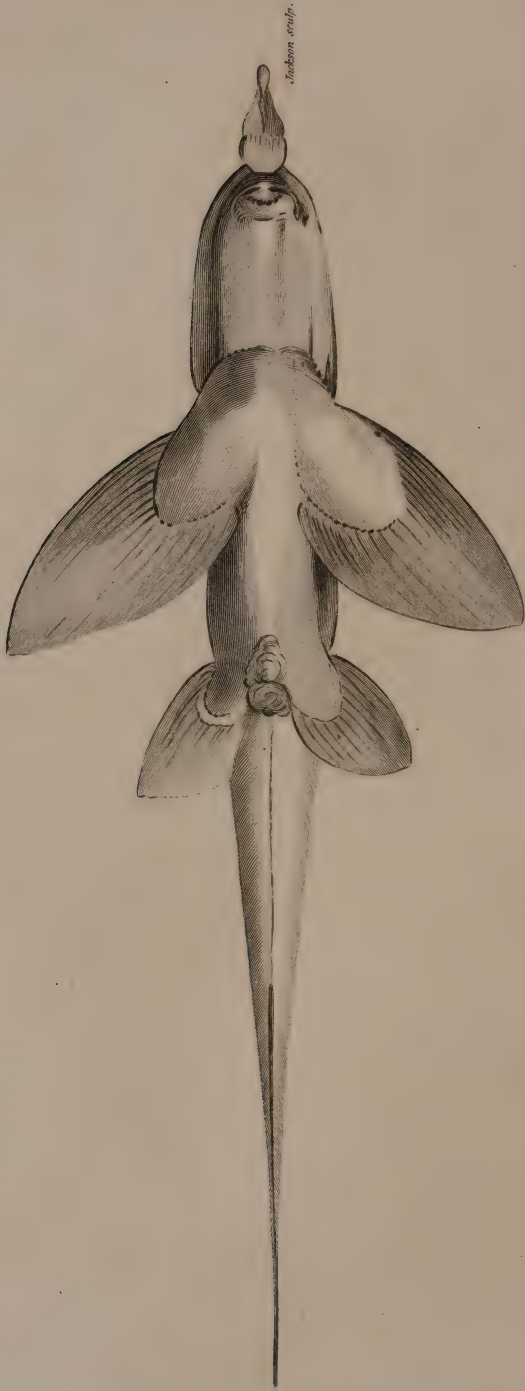
Elephant-Fish. *Cook. it. 1. p. 18.*

SIZE nearly similar to that of the preceding species, but with the front rather sloping downwards, and the upper lip extended into a lengthened cartilaginous flap or appendage, bending downwards in a reversed direction beneath: mouth as in the former fish: eyes large: front marked by undulating lines, but with less numerous pores: first dorsal fin like that of the *C. borealis*; second re-



SOUTHERN CHIMERA.





SOUTHERN CHIMÆRA. under view

sembling the first, but without the spine: the third very shallow, and continued into a thread, as in the former species, but of less extent: pectoral fins large: ventral middle-sized; anal small: lateral line commencing from the upper sides of the head, and thence continued, in a strait direction, to the beginning of the caudal fin, at which place it terminates: general colour of the whole fish silvery, with a yellowish-brown cast on the upper parts: fins pale brown. Native of the Southern seas, where its manner of life is similar to that of the *C. borealis* in the Northern Hemisphere.

ACIPENSER. STURGEON.

Generic Character.

<i>Rostrum</i> subtus cirratum.	<i>Snout</i> bearded beneath.
<i>Os</i> sub capite, ovatum, edentulum, retractile.	<i>Mouth</i> beneath the head, ovate, toothless, retractile.
<i>Corpus</i> elongatum, supra tuberculis cataphractum.	<i>Body</i> elongated, mailed above by tubercles.

COMMON STURGEON.

Acipenser Sturio. A. griseus, subtus albidus, corpore supra serie quintuplici tuberculato, cute scabro.

Grey rough-skinned Sturgeon, whitish beneath, with the body shielded above by a quintuple series of tubercles.

Acipenser Sturio. A. cirris quatuor, squamis dorsalibus undecim. Linn. Syst. Nat.

Acipenser scutorum ordinibus quinque ad corpus asperum. Bloch. t. 88.

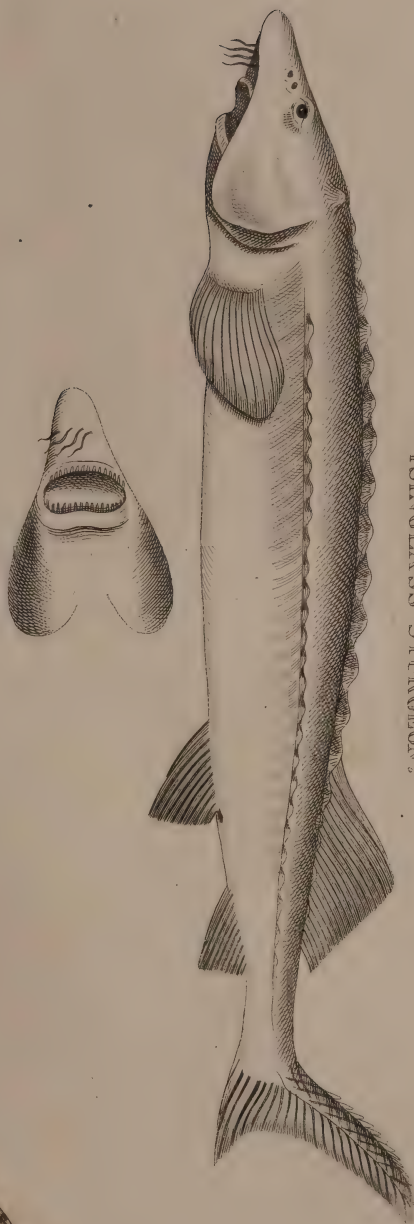
Acipenser. Rondel. Gesn. &c.

Sturio. Salvian. aquat. 113.

Sturgeon. Penn. Brit. Zool. Will. ichth. &c.

THE Sturgeon is a fish of very great size, growing to the length of eighteen or twenty feet: it is an inhabitant of the Northern European and American seas, migrating during the early summer months into the larger rivers and lakes, and returning to the sea again in autumn, after having deposited its spawn. Its form is long and slender;

ISINGLASS STURGEON.



COMMON STURGEON.

Zieth. sculp.

the body pentagonal, gradually tapering towards the tail, and covered throughout the whole length by five rows of strong, large, bony tubercles, rounded at the base, radiated from the centre, and terminated above by a sharp curved point in a reversed direction: of these five rows of tubercles one is situated on the top of the back, and two on each side the body, the lowermost forming the edges of the abdomen, which is flat: the whole skin also, except on the belly, is roughened by very small tubercles of similar structure: the head is rather large, sloping on each side, and covered with bony plates; the snout long and slender, obtuse at the tip, and furnished beneath, at some distance from the end, with four long, worm-shaped beards or cirrhi: the mouth is placed immediately beneath the upper part of the head, and consists of a transverse oval orifice, totally destitute of teeth, but containing a thick and strong tongue, and is bounded above and below by a strong, cartilaginous edge or lip, which it has the power of retracting and closing at pleasure: the gill-cover, on each side, consists of an oval, radiated plate: the pectoral fins are oval, and middle-sized: the dorsal small, and situated very near the tail; the ventral and anal fins are also small, and placed nearly opposite the dorsal: the tail is lobed or slightly forked, the upper lobe being strengthened above by a bony ridge or carina, and extending far beyond the lower: the general colour is cinereous above, with dusky variegations or specks and whitish or yellowish beneath: the tops of the tubercles are also of a similar cast.

The Sturgeon is generally considered as a fish of slow motion, and is observed to lie for a considerable time in the same situation: it even makes but a very faint resistance when first taken, except by sometimes striking with its tail; having great strength in that part: it is however sometimes seen to swim with considerable rapidity and to spring with great force out of the water at intervals. During its residence in the sea it is supposed to live principally on the smaller fishes, and particularly on young Herrings, Mackrel, &c. and in rivers on various kinds of worms, &c. It is rarely taken at any great distance from shore, but frequents such parts of the sea as are not remote from the æstuaries of great rivers. Catesby informs us that in those of North America Sturgeons appear in great abundance in the months of May, June, and July, occasionally springing out of the water to the height of some yards, and falling on their sides with a noise that may be heard to the distance of some miles. In some of the rivers of Virginia they are so numerous that six hundred have been taken in the space of two days, by merely putting down a pole, with a strong hook at the end, and drawing it up again on perceiving that it rubbed against a fish*. According to Mr. Pennant and Dr. Bloch great numbers are taken during summer in the lakes *Frischhaff* and *Curischaff* near *Pillau*, in large nets made of small cord: the adjacent shores are formed into districts, and farmed out to com-

* *Penn. Arct. Zool. append.* p. 106. *Burnaby's Trav. Soc.* p. 15.

panies of fishermen, some being rented for six thousand guilders, or near three hundred pounds per annum. Dr. Bloch informs us that in France the Sturgeon-fishery commences in February in the river *Garonne* on the coast of *Bordeaux*, and lasts till July or August.

The Sturgeon is admired for the delicacy and firmness of its flesh, which is white, and when roasted is thought to resemble veal: it is however generally eaten pickled, and the major part of what we receive in that state comes either from the Baltic rivers or those of North America. Of the roe, properly salted and dried, is prepared the substance known by the name of *Caviar*, a superior kind of which is however made from that of a smaller species, hereafter to be described.

In our own country the Sturgeon annually ascends rivers, but in no great quantity, and is occasionally taken in the Salmon-nets: the largest recorded by Mr. Pennant, as taken in England, was of the weight of four hundred and sixty pounds. In its manner of breeding the Sturgeon forms an exception among the cartilaginous fishes, since, as before observed, it is oviparous: it is a very prolific fish, and the globules of the roe or spawn are about the size of hemp-seeds.

The Sturgeon was a fish in high repute among the Greeks and Romans, and, according to Pliny, was brought to table with much pomp, and ornamented with flowers, the slaves who carried it being also adorned with garlands, and accompanied by music. The flavour of the Sturgeon is said to vary

according to the food on which it has principally fed; for which reason it is distinguished in Sweden and other northern regions into Mackrel-Sturgeon, Herring-Sturgeon, &c. Dr. Bloch observes that the Linnæan specific character of this fish is not quite correct, since the number of dorsal tubercles varies from eleven to thirteen; neither is the number of the lateral or ventral rows more constant, varying in a similar manner. Some have supposed the tubercles of the Sturgeon to be annually cast, in the same manner as those on Rays. It may be added that the Sturgeon is able to survive some days when taken out of water; the gill-covers being edged by a soft membranaceous border, which by closing accurately, prevents the access of atmospheric air to the branchiæ.

SMALLER STURGEON.

Acipenser Schypa. *A. rostro obtuso, oris diametro tertiam partem longiore, cirris rostri apici propioribus, labiis bifidis.*
Lin. Gmel. Guldenst. nov. comm. Petrop. 16. p. 532.

Sturgeon with obtuse snout, a third part larger than the diameter of the mouth; the beards nearer the end of the snout, and the lips bifid.

It is doubtful whether this be a distinct species, or a variety of the common Sturgeon, from which it principally differs in its smaller size, rarely exceeding the length of five feet, and in the few particulars mentioned in the specific character given by its describer Guldenstadt. It is a native of the Caspian sea, and some of the lakes of Siberia.

ISINGLASS STURGEON.

Acipenser Huso. *A. fusco-cærulescens, tuberculis lateralibus subobsoletis, abdomine subargenteo.*

Dusky-blueish Sturgeon, with somewhat obliterated lateral tubercles, and slightly silvery abdomen.

Acipenser Huso. *A. cirris quatuor, squamis dorsalibus tredecim, caudalibus quadraginta-tribus.* Lin. Syst. Nat.

Acipenser apertura branchiali partim nuda. Bloch. t. 129.

Huso. Aldr. pisc. p. 534. Jonst. pisc. t. 25. f. 1. 3.

A LARGER fish than the common Sturgeon, having been often found of the length of twenty-five feet: general shape the same; colour dusky or blackish blue above, silvery on the sides and abdomen, with a tinge of rose-colour on the latter: general appearance smoother than in the common Sturgeon, the dorsal tubercles being less protuberant, and those along the sides much smaller, and in some specimens of a very advanced growth altogether wanting: mouth much larger than in the *A. Sturio*, with thick, crescent-shaped lips: skin smooth and viscid. Native of the Northern, Caspian, and Mediterranean seas, migrating from them into the adjoining rivers: found more particularly in the Volga and the Danube.

It is from the sound or air-bladder of this species that the well-known substance called isinglass is prepared: this is done by cleansing, splitting, and drying that part, either in the air, or occasionally by a fire, and either twisting or flattening it, according to the particular sorts by which it is distinguished in commerce. An ample account of the

preparation of this useful article may be found in the sixty-third volume of the Philosophical Transactions: the skin, tail, stomach, and intestines of the fish are used for the same purpose; and indeed an isinglass of a somewhat inferior kind may be prepared from the same parts of many other fishes.

STERLET.

Acipenser Ruthenus. A. subfuscus, lateribus subrubro maculatis, corpore supra serie triplici tuberculato.

Brownish Sturgeon, with the sides spotted with pale red, and the body shielded above by a triple series of tubercles.

Acipenser Ruthenus. A. cirris quatuor, squamis dorsalibus quindecim. Lin. Syst. Nat.

Acipenser ordinibus scutorum tribus. Bloch. t. 89.

Sterlet. Bruyn. it. 93. t. 33.

THE Sterlet is the smallest species of Sturgeon yet discovered: in length it rarely exceeds three feet, and is principally found in the Caspian sea and the adjoining rivers Volga and Ural: it is also found, though much less frequently, in the Baltic sea. It is said to have been introduced into some of the large lakes of Sweden by Frederick the first; and into some parts of Brandenburg and Pomerania by the King of Prussia. The head of this species is longer in proportion than in other Sturgeons, and flattened both above and below: the body rather more slender, and the bony shields with which the upper parts are covered less protuberant and of a thinner substance: along the belly are also disposed two ranges of small, flat shields: the general

STERLET STURGEON



1804. May 10. London. *Trachina* by G. Karsky. *Plat. Stera.*

colour is dusky above, whitish, and variegated with rose coloured spots beneath: the rows of tubercles are of a yellow cast, and the whole skin is slightly roughened into a kind of scaly appearance: the ventral and anal fins are of a deep rose-colour: the rest blueish-brown: the usual number of shields or tubercles is, according to Dr. Bloch, fourteen along the back, and fifty-nine along each side.

The Sterlet is in much higher esteem as an article of food than any other species, and is even considered as one of the most delicate of fishes. Sterlet-soup, it is well known, formed one of the favourite luxuries of that gigantic epicure Prince Potemkin of Russia, who in seasons when the fish happened to be unusually dear, was content to purchase it at a price so extravagant, that a single tureen, forming the mere prelude to his repast, stood him in the sum of three hundred rubles!

The Sterlet indeed in Russia makes its appearance chiefly at the entertainments of the higher nobility, and the Caviar prepared from its roe is said to be confined almost exclusively to the use of the royal table.

Like the rest of this genus it is a prolific fish, and usually spawns in the months of May and June: it is said to live on worms and small fishes, and is particularly fond of the roe of the common Sturgeon, for which reason it often follows that species in its migrations.

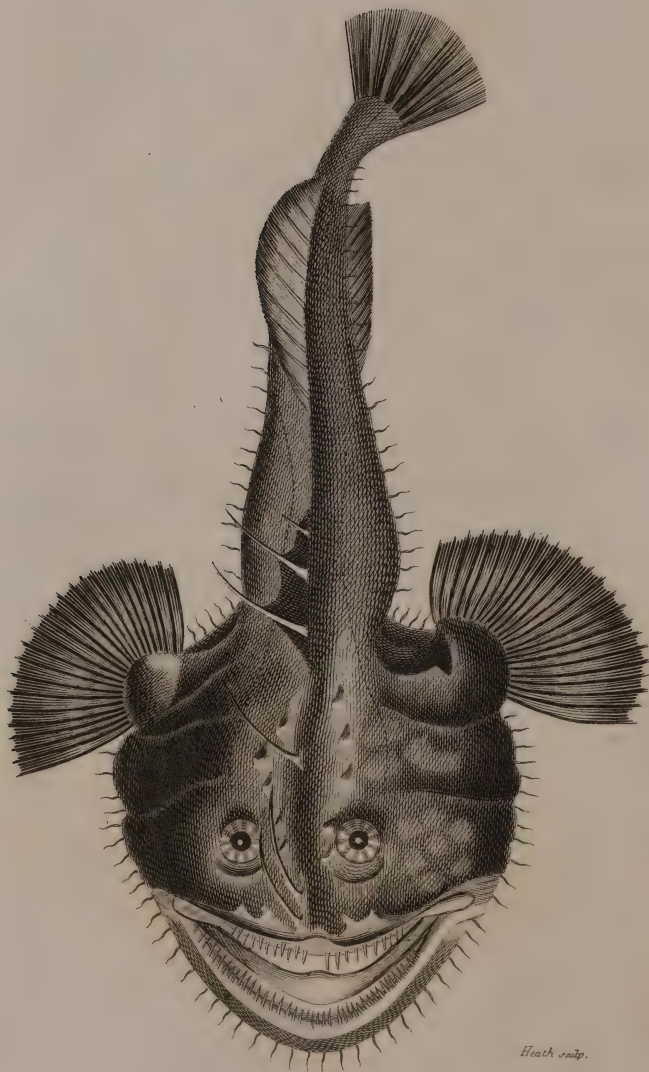
STELLATED STURGEON.

Acipenser Stellatus. *A. rostro spatulato subrecurvo, diametro oris transverso sextuplo longiore, cirris ori propioribus, labiis integris.* Lin. Gmel. Guldenst. nov. comm. Petrop. 16. p. 533.

Sturgeon with spatulate subrecurved snout, and entire lips.

Acipenser Kostar. Gmelin. it. 3. p. 238.

LENGTH from four to five feet: body more slender than in the Sterlet: head subtetragonal, and roughened with stellated marks and tubercles: skin roughened by crenated scale-like rudiments: form pentangular, owing to five rows of shields, each of which is keeled and sharp-pointed: in the dorsal row are thirteen, and in the superior lateral rows thirty-five: besides these is a row of smaller ones on each side the abdomen, and beyond the vent are placed three shields: general colour dusky above, spotted with white on the lower part of the sides, and milk-white beneath: fins longer than in other Sturgeons. Inhabits the Caspian sea, out of which it migrates in innumerable shoals into the rivers.



EUROPEAN ANGLER.

LOPHIUS. ANGLER.

Generic Character.

<i>Caput</i> depressum.	<i>Head</i> depressed.
<i>Dentes</i> plurimi, acuti. Lin-	<i>Teeth</i> numerous, sharp.
<i>gua</i> dentibus armata.	Tongue armed with teeth.
<i>Corpus</i> crassum.	
<i>Pinnæ pectorales</i> brachiatæ.	<i>Pectoral fins</i> brachiated.

EUROPEAN ANGLER.

Lophius Europæus. *L. depressus fuscus, antice rotundatus, subtus albidus, lateribus fimbriatis.*

Brown depressed Angler, rounded in front, whitish beneath, with fringed sides.

Lophius piscatorius. *L. depressus, capite rotundato.* *Lin. Syst. Nat.*

Lophius capite corpore latiore. *Bloch. t. 87.*

Rana marina. *Bellon. aq. p. 85: Jonst. pisc. t. 11. f. 8*

Rana piscatrix, Toadfish, &c. *Will. ichth. p. 85. t. E. 1.*

Common Angler. *Penn. Brit. Zool.*

THE genus *Lophius* is remarkable for a peculiarly uncouth appearance; the body being thick and shapeless, and the fins short and broad: the largest of the genus is the *Lophius piscatorius*, popularly known by the title of the Frog-Fish. It is an inhabitant of the European seas, where it sometimes arrives at a great size, having been seen to measure six or seven feet in length: its more

general length however is from two to three or four feet. The shape bears some resemblance to that of a Tadpole, the head being lost as it were in the outline of the sides, and the hind-parts tapering pretty suddenly towards the tail: the skin is smooth, but the upper parts of the animal are marked by various inequalities of surface, rising here and there into the appearance of short spines: the eyes are large, and of a whitish colour, with the iris radiated by several dusky stripes: the mouth excessively wide, with the lower jaw considerably longer than the upper: the teeth very sharp and numerous, both in the mouth and on the tongue: from the upper part of the head spring two or three long and linear tentacula or processes, situated in a longitudinal direction behind each other, and followed by a few shorter ones down the back: the sides or edges of the body are fringed, at intervals, with many shorter appendages of a somewhat similar nature: the pectoral fins are large, of a rounded and slightly scolloped outline, and are seated on very thick, arm-like processes: the ventral fins are short, cartilaginous, of a whitish colour, and strongly palmated: the dorsal fin is rather shallow and situated at the lower part of the back: the ventral is placed nearly opposite and is of similar appearance, but somewhat smaller: the tail is short and rounded. The colour of the whole animal on the upper parts is brown, with a few deeper and paler variegations, and beneath whitish. This fish is observed chiefly to frequent the shallow parts of the sea, lying in ambush, half-covered by

the weeds and mud: in this situation it is said to move about the tentacula or long processes on the head, &c. in such a manner that the smaller fishes, deceived by their resemblance to worms, and attempting to seize them, become an easy prey to the Lophius. This practice, which is mentioned by Pliny and others, induced Mr. Pennant, in the British Zoology, to distinguish the genus by the English title of *Angler*.

CORNISH ANGLER.

Lophius Cornubicus. *L. depressus subelongatus, corpore postice fimbriato.*

Depressed subelongated Angler, with the body fringed at the hind part.

Fishing-Frog of Mount's-Bay. *Borl. Cornw. 266. pl. 27. f. 6.*
Long Angler. *Penn. Brit. Zool.*

It may perhaps be doubted whether this be truly distinct from the preceding fish, or whether it may not rather constitute a sexual difference or a variety. It is mentioned by Dr. Borlace in his Natural History of Cornwall, and is said to be of a longer form than the common Angler, with the head more bony, rough, and aculeated, as well as destitute of the fringed appendages, which take place only towards the hind-part of the body: the pectoral fins are tipped with spines of about an inch and three quarters in length, and on the tail are similar ones but somewhat shorter, measuring only an inch. Observed about Mount's Bay in Cornwall.

MURICATED ANGLER.

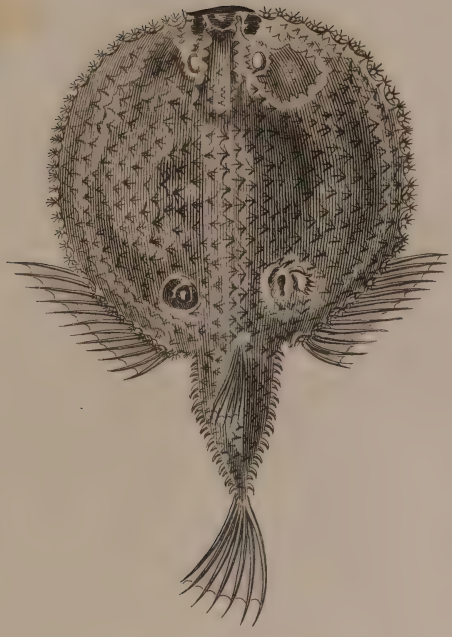
Lophius Muricatus. *L. depressus antice orbiculatus, supra spinis radiatis muricatus.*

Depressed Angler, with the fore-parts orbicular, and muricated above by radiated spines.

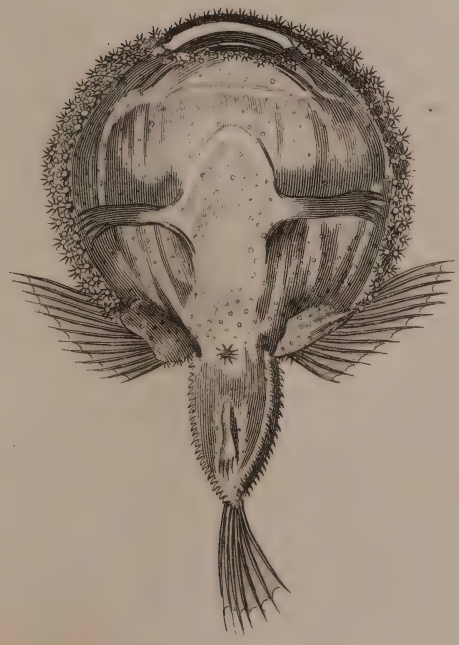
Lophie Faujas. Cepede.

DESCRIBED by Cepede, from a specimen in the Museum of the Prince of Orange: body very flat, orbicular, and covered above with very numerous, small tubercles tipped with divided or radiated spines: hind part contracting suddenly, covered with similar spines, and terminated by the tail-fin, which is of moderate size and slightly rounded: pectoral fins large, and situated lower than in the common Angler: ventral on each side the middle of the body beneath: dorsal fin small, and placed low on the back; anal nearly opposite: mouth of moderate width, and terminal, with equal jaws: eyes small: lower lip slightly fringed, as are likewise the sides of the body: branchial orifices placed on each side the disk of the body, and at no great distance from the beginning of the tail: length of the specimen examined about four inches.

MURICATED ANGLER.



Fimbria setigera







H. G. S. P.

BEAKED ANGLER.

1854. June 1. London. Published by G. Kenney, Fleet Street.

BEAKED ANGLER.

Lophius Rostratus. *L. depressus subferrugineus, supra tuberculatus, capite rostrato.*

Depressed subferruginous Angler, tuberculated above, with beaked head.

Lophius Vespertilio. *L. depressus, capite rostrato.* *Lin. Syst. Nat.*

Rana piscatrix Americana. *Seb. mus. 3. t. 74. f. 2.*

Lophius capite retuso? *Brown Jam. pl. 48. f. 3. ?*

Guacucuja. *Marcgr. Bras. p. 143.*

LENGTH from ten to eighteen inches: body broad in the middle, tapering towards the tail, and strongly acuminate in front, so as to form a sharp-pointed, lengthened snout: mouth of moderate width, and situated at a considerable distance beneath the tip of the snout: above each nostril a short cartilaginous filament, with a dilated tip: pectoral fins situated on very strong arm-shaped bases: ventral smaller and placed nearer the front: dorsal very small, and situated at a small distance beyond the pectoral: tail rounded at the end: whole animal covered above with numerous, scattered, roundish, crenated tubercles, with pointed tops: the interstices of the skin are roughened by minute points: under surface also roughened by small points but destitute of tubercles: colour above pale red-brown; beneath whitish. Native of the South-American seas, lying among weeds, &c. and preying, like the common Angler, on small fishes, worms, &c.

HARLEQUIN ANGLER.

Lophius Histrio. L. compressus fusco-flavescens, maculis irregularibus nigricantibus, capite corporeque cirrhis.

Yellowish-brown compressed Angler, with irregular blackish spots, and cirri on the head and body.

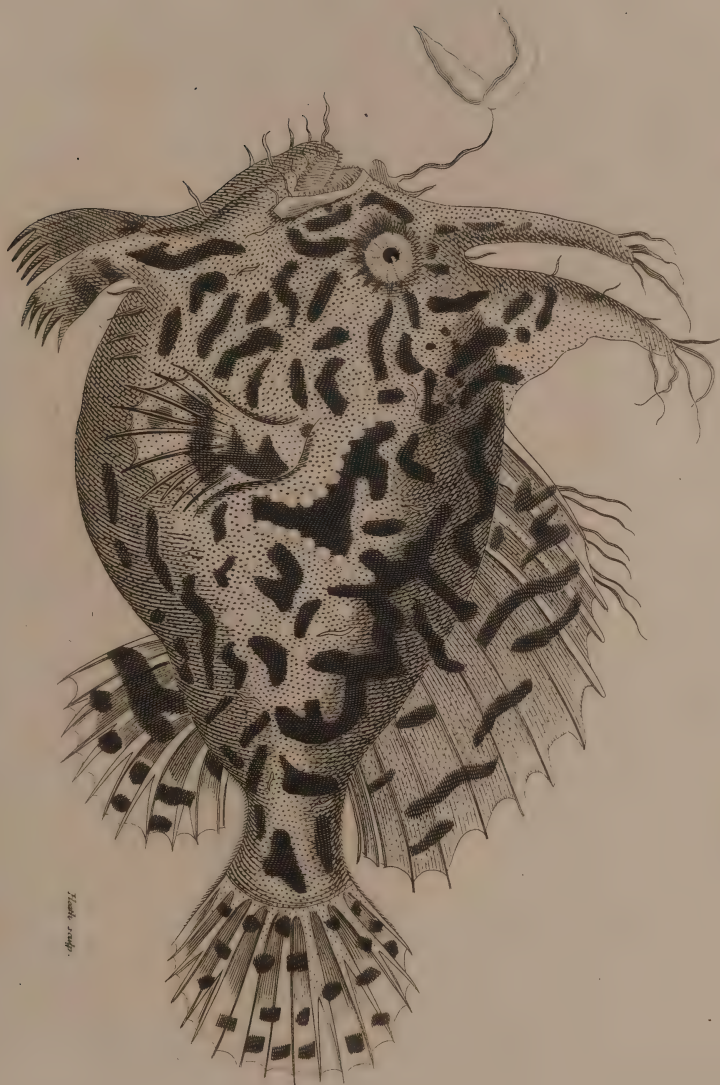
Lophius Histrio. L. compressus. Lin. Syst. Nat.

Piscis Brasiliensis cornutus. Petiv. gaz. t. 20. f. 6.

Guaperva. Marcgr. Bras. 150. Will. ichth. 50. t. E. 2. f. 2.

Lophius corpore scabro, capite obtuso. Bloch. t. 111.

ONE of the most grotesque and singular of fishes: body thick, but much compressed: mouth of moderate width: eyes large, with radiated irides: pectoral fins middle sized: ventral resembling a kind of short arms, situated very forwards, and palmated at their tips: dorsal fin large, and extending from the middle of the back to within a small distance of the tail, which is of a rounded shape: vent-fin opposite the hind part of the dorsal: at a small distance above the upper lip rises a long and slender cartilaginous process or filament, dividing at top into two dilated oval and pointed appendages: beyond this a strong and thick fleshy process, terminated by a few filaments: beyond this a similar process but much larger and thicker, and tipped, like the former, with several filaments: lower lip, sides of the body, and fore part of the dorsal fin bearded with scattered cirri: general colour of the whole animal yellow-brown, irregularly marbled or blotched with very deep brown or blackish variegations, here and there edged with white. This species is a native of the Indian and American seas,



HARLEQUIN ANGLER.

1864 June 2 London. Published by G. Kearsley Fleet Street.

Trach. angler.

growing to the length of ten or twelve inches, and in manners resembling the European Angler. Mons^r. Renard, in his History of Fishes, affirms that he knew an instance of an individual of this species kept for three days out of water, and walking about the house in the manner of a dog!!!

 STRIPED ANGLER.

Lophius Striatus. *L. compressus, fusco-flavescens, striis undique confertissimis nigris.* Viv. Nat. 5. t. 175.

Compressed yellowish-brown Angler, marked on all parts with very numerous black streaks.

Striated Lophius. Nat. Misc. 5. t. 175.

Much allied to the *L. Histrio*, but differing in being marked all over, chiefly in a transverse direction, by very numerous and closely-placed, narrow, black streaks, of unequal lengths, with fine black lines interposed: the streaks round the eyes are placed in a radiated direction: fins as in the *Histrio*, and marked with black spots: mouth wide: tongue broad, and paved above with flattened teeth: from the top of the mouth a long filament, slightly dilated into an oval shape at the tip: at some distance beyond this two strong and thick processes, as in the former species, but without filaments at their tip: rays of the dorsal fin each terminating in a fine cirrus. Native of the Southern seas: observed about the coasts of Otaheitee during the first voyage of Captain Cook. Length of the specimen described about five inches.

PAINTED ANGLER.

Lophius Pictus. L. compressus fuscus, lituris subflavis rubro marginatis.

Compressed brown Angler, with yellowish blotches margined with red.

Lophius pictus. Variegated Lophius. Nat. Misc. 5. pl. 176.

ALLIED in some degree to the *Lophius Histrio*: length of the specimen described about four inches: colour dull brown, with a few very large, irregular patches of pale yellow, strongly clouded on the edges with deep crimson: between these blotches are interposed a few rather small, roundish, black spots: over the mouth a long filament, dividing into three at the top: beyond this a pair of thick processes as in the two preceding species: pectoral and ventral fins strongly radiated at the ends by the fibres: native of the Pacific: observed about Otaheitee, New-Holland, &c.

MARBLED ANGLER.

Lophius Marmoratus. L. subcompressus lividus, albido ferrugineoque varius, pinna dorsali simplici.

Subcompressed livid Angler with whitish and ferruginous variegations, and simple dorsal fin. *Nat. Misc. 5. t. 176.*

LENGTH of the specimen described about five inches: shape oval, or nearly resembling that of the generality of fishes: body slightly compressed: back arched, and furnished with a single and rather

PAINTED ANGLER.



PAINTED ANGLER.

Head only.

shallow fin, commencing at some distance beyond the head, and extending to within a small distance from the tail, where it is somewhat broader than at its origin: pectoral fins much resembling those of the generality of fishes, the bases or arms being scarce apparent: ventral short, arm-shaped, and terminated by thick and slightly marked lobes, so as to resemble the paws of a quadruped: anal fin longish, and situated near the tail, which is slightly rounded: colour on the upper parts black-brown with a few blueish clouds and spots: on the lower parts whitish, both colours breaking into each other on the sides of the fish, and white parts being edged with dull red: eyes white, radiated with black: mouth wide: above the upper lip a long filament, forking into two at the tip. Native of the Pacific: observed about the coast of Otaheitee, &c.

COMMERSONIAN ANGLER.

Lophius Commersonii. *Lophius compressus niger, macula utrinque rotundata alba.*

Compressed black Angler, with a rounded white spot on each side.

Lophie Commerson. *Cepede.*

ALLIED to the *Harlequin Angler*, but entirely of a black colour, except a small, round, milk-white spot on each side: skin rough or granulated: tongue roughened with small teeth: above the eyes a long and slender filament with a clavated tip: tips of the fins rather pale: length a few inches: observed by Commerson in the Indian seas.

CYCLOPTERUS. SUCKER.

Generic Character.

<i>Caput</i> obtusum; Dentes maxillares: Lingua brevis, crassa.	<i>Head</i> obtuse: Teeth in the jaws: Tongue short and thick.
<i>Corpus</i> crassum, squamis nudum.	<i>Body</i> thick, without scales.
<i>Pinnæ ventrales</i> in orbiculum connatæ.	<i>Ventral fins</i> united into a circle.

LUMP SUCKER.

Cyclopterus Lumpus. *C. nigricans, subtus ruber, corpore tuberculis osseis angulato.*

Blackish Sucker, red beneath, with the body angulated by bony tubercles.

Cyclopterus Lumpus. *C. corpore squamis osseis angulato.* Lin. *Syst. Nat.*

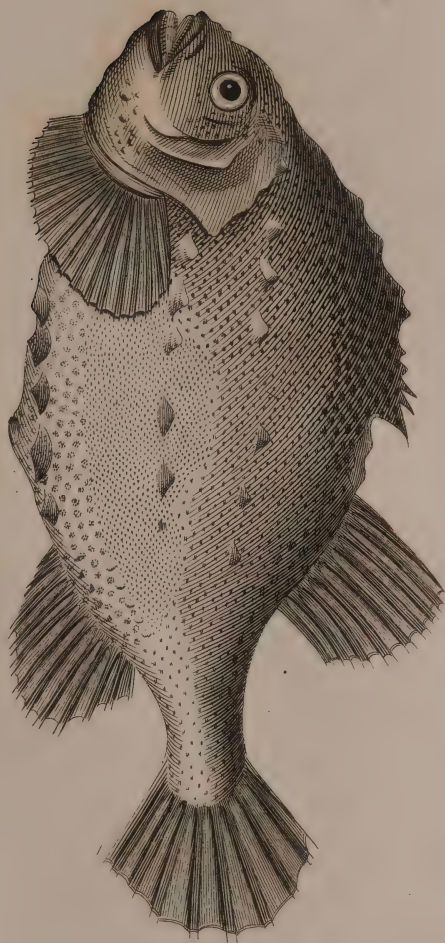
Cyclopterus ordinibus tuberculorum septem. Bloch. *t.* 90.

Lumpus Anglorum. Gesn. Will, &c.

Lump Sucker. Penn. Brit. Zool.

“THIS singular fish (says Mr. Pennant) increases to the weight of seven pounds, and to the length of nineteen inches: the shape of the body is like that of the bream, deep and very thick, and it swims edgeways: the back is sharp and elevated, the belly flat: the irides are of a cherry-colour, the lips, mouth, and tongue of a deeper red: the jaws

LUMP SUCKER.



SNAIL SUCKER.

Hard copy.



lined with innumerable small teeth; the tongue very thick: along the ridge of the back is a row of large bony tubercles; from above the eye to within a small space of the tail is another row; beneath that a third, commencing at the gills; and on each side the belly a fourth row, consisting of five tubercles like the other: the whole skin is rough, with small tubercles: on the upper part of the back is a thick ridge, improperly called a fin, being destitute of spines; beneath that is the dorsal fin, of a brownish hue, reaching within an inch of the tail: on the belly, just opposite, is another of the same form: the belly is of a bright crimson colour: the pectoral fins are large and broad, almost uniting at their base: beneath these is the part by which it adheres to the rocks, &c. it consists of an oval aperture, surrounded with a fleshy muscular and obtuse soft substance, edged with small thread-ed appendages, which concur as so many claspers: (tail and vent fins purple.) By means of this part it adheres with vast force to any thing it pleases: as a proof of its tenacity, we have known, that on flinging a fish of this species, just caught, into a pail of water, it fixed itself so firmly to the bottom, that on taking the fish by the tail, the whole pail was lifted, though it held some gallons, and that without removing the fish from its hold."

" These fish resort in multitudes, during the spring, to the coast of Sutherland, near the *Ord of Cathness*. The seals, which swim beneath, prey greatly on them, leaving the skins; numbers of which, thus emptied, float at that season ashore.

It is easy to distinguish the place where seals are devouring this or any unctuous fish, by a smoothness of the water immediately above the spot: this fact is now established, it being a tried property of oil to still the agitation of the waves and render them smooth*. Great numbers of these fish are found in the Greenland seas, during the months of April and May, when they resort near the shore to spawn: their roe is remarkably large, which the Greenlanders boil to a pulp and eat: they are extremely fat, which recommends them the more to the natives, who admire oily food: they call them *Nipisets* or *Cat-Fish*, and take quantities of them during the season. This fish is sometimes eaten in England, being stewed like Carp, but is both flabby and insipid."

Var. ?

PYRAMIDAL SUCKER.

Cyclopterus Pyramidatus. C. dorso pyramidato,

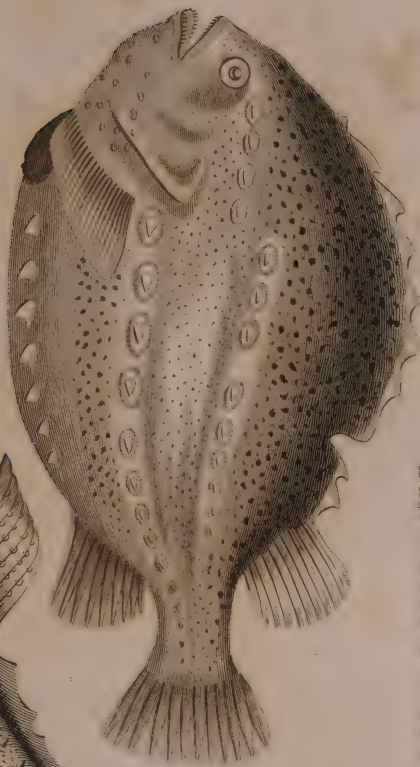
Sucker with pyramidal back.

Lumpus gibbosus. Will, ichth. p. 209. t. N. 10. f. 2.

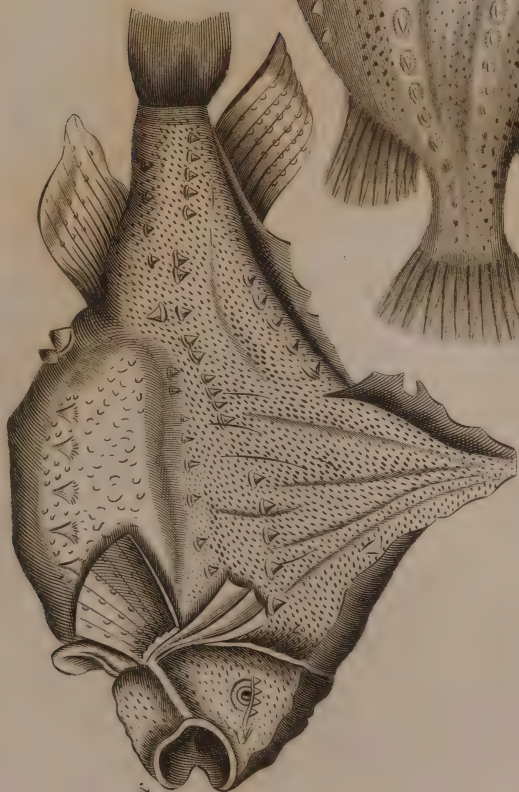
HABIT or general appearance that of the common Sucker, but with the back raised into a high pyramidal elevation: colour, so far as may be judged from a dried specimen, the same as in the common Sucker, of which it seems to be generally considered

* See Phil. Trans. 1774. p. 445.

PAVONIAN STICKLE



PYRAMIDAL STICKLE

*Jackson smth.*

as a variety : first described by Gesner, and from him by Willughby : said to be found in the Baltic sea and the Northern ocean, and, like the former kind, is occasionally seen about the coasts of Scotland. In the Leverian Museum is a very fine specimen of this fish.

Var.

PAVONIAN SUCKER.

Cyclopterus Pavoninus. *C. argenteo-thalassinus, lateribus subroseis, dorso cæruleo.*

Silvery-green Sucker, with the sides subrosaceous, and the back blue.

Cyclopterus pavoninus. *Nat. Misc. 9. t. 310.*

AN accurate description of this highly beautiful variety was transmitted to me some years ago by the Revd. Mr. Hugh Davies, of Aber near Bangor, in North-Wales, and was introduced into the ninth volume of the Naturalist's Miscellany. Mr. Davies observes that it seems to have escaped the notice of every English Ichthyologist, but is described by Klein in his *Historia Piscium* under the title of *Oncotian dilute viridis et vivide coloribus pavoneis resplendens, dorso parum nigricante, pinnis viridibus, ad ambitum deauratis*. In all particulars, except in size and colours, it agrees with the common Lump-Fish : the back is of a fine azure, deepening towards the ridge : the sides are tinged with crimson : the mouth, sides of the head, and all the

under parts, to the tail, are of a delicate sea-green, with a silvery tinge on the cheeks, the pectoral fins, and the part of the body next the tail: the iris is likewise silvery, the pupil black: the fins and tail terminate in a fine pale yellow. It has been observed by Dr. Pallas that the Lump-Fish probably exhibits this variety of splendid colours in its younger state only, but Mr. Davies remarks that this observation does not hold good, (universally at least,) since he has seen a specimen of smaller size than the beautiful variety above described, which was entirely of a brown colour. The pavonian variety observed by Mr. Davies measured about six inches in length, and about three and a half in breadth, and Mr. D. is inclined to suppose that it does not attain to the size of the common Lump-Fish.

LARGE-TOOTHED SUCKER.

Cyclopterus Dentex. C. corpore nudo, capite inermi glaberrimo, pinnis sejunctis. Lin. Gmel. Pall. spic. zool. 7. t. 1. f. 1.—4.

Sucker with naked body, very smooth unarmed head, and separate fins.

HEAD very large, much broader than the body, depressed, flat beneath: eyes oval, with silvery irides: mouth as wide as the head: lips thick, wrinkled, and doubled, with two very soft fleshy caruncles within: tongue short, of an elliptic-rounded shape: mandibles rounded: teeth conic, unequal; in the upper jaw four to the right, and three to the left: in the lower ten middle-teeth,

and seven lateral: gill-covers large and bony: abdomen ventricose: vent situated close to the tail, which is compressed, flattish, and subattenuated: fins soft and whitish, with thick, setaceous, cartilaginous rays: dorsal fin somewhat anterior to the anal: pectoral fins semicircular: tail rounded: size of the fish about thrice that of the *Cottus grunniens*: colour reddish. Native of the American seas.

GELATINOUS SUCKER.

Cyclopterus Gelatinosus. *C. gelatinosus, subdiaphanus, roseus, pinna dorsali analique violaceis.*

Gelatinous, subtransparent, rose-coloured Sucker, with violet-coloured dorsal and anal fin.

Cyclopterus gelatinosus. *C. corpore nudo subdiaphano gelatinoso, pinnis pectoralibus latissimis. Lin. Gmel. Pall. spic. zool. 7. p. 19.*

LENGTH about eighteen inches: body slender, oblong, compressed: thicker towards the head, and gradually tapering to the tail: colour whitish with a rosy tinge: skin smooth; flesh very soft, inso-much as to tremble like jelly when touched: dorsal and anal fin dark violet: pectoral fins flaccid and rounded: native of the seas about the eastern parts of Kamtschatka and the opposite American shores: not eatable, being refused even by the Kamtschatkan dogs, which are fed during part of the year with fish of various kinds.

VENTRICOSE SUCKER.

Cyclopterus Ventricosus. *C. olivaceus, abdomine ventricoso.*
Olivaceous Sucker, with ventricose abdomen.

Cyclopterus ventricosus. *C. corpore nudo, vesica urinaria
amplissima gemina, abdomen distendente.* Lin. Gmel. Pall.
spic. zool. 7. p. 15.

LENGTH about a foot: skin covered with livid mucus: habit approaching to that of the *Weesle Gadus*: head thick, blunt, and flattish on the top: eyes lateral, on the upper part of the head: dorsal fin whitish-yellow with black rays, of which the sixth is longer than the rest: pectoral fins wide: tail suddenly attenuated beyond the vent: instrument of suction orbicular or suboval, with a fleshy, yellow, wrinkled disk, and a smooth, contractile border. Native of the seas between America and Kamtschatka.

 SNAIL SUCKER.

Cyclopterus Liparis. *C. subfuscus, maculis nigricantibus, subtus albidus, radio primo pinnarum pectoralium elongato.*

Brownish Sucker, with blackish spots, beneath whitish, with the first ray of the pectoral fins elongated.

Cyclopterus Liparis. *C. corpore nudo, pinnis dorsali anali caudalique unitis.* Lin. Syst. Nat. p. 414.

Cyclopterus pinna pectorali barbiformi. Bloch. t. 133 f. 3. 4.

Unctuous Sucker. Penn. Brit. Zool.

LENGTH from five to sixteen or eighteen inches: shape lengthened, thick, compressed, soft, unctu-

ous, and mucous like a snail: body subtransparent; brownish above, with darker stripes, beneath white, with a cast of yellow on the head and sides: head large, thick, and rounded: eyes small: fins brown: tail short and rounded: instrument of adhesion round, of a blueish colour, and marked with twelve radiate spots. Native of the Northern seas, as far as Kamtschatka: occasionally observed about the British coasts: sometimes ascends rivers.

Var. ?

LINEATED SUCKER.

Cyclopterus Lineatus. C. subferrugineus, lineis longitudinalibus albidis undulatus.

Subferruginous Sucker, undulated with longitudinal whitish lines.

Cyclopterus lineatus. C. corpore nudo, pinnis dorsali et anali sensim in caudalem excurrentibus. Linn. Gmel. Lepechin. nov. comm. Petrop. 18. p. 522.

GREATLY resembles the preceding fish, of which it is perhaps a variety: colour chesnut, with strait and undulated whitish longitudinal bands: body very thick on the foreparts, and tapering behind: head depressed: back gibbous: dorsal fin and anal fin marked by small, pale-green bands: pectoral fins large, and lunate: tail small: orb of adhesion thick and fleshy, protuberant at the edge, and beset with reddish papillæ. Native of the White Sea.

SPINE-HEADED SUCKER.

Cyclopterus Bispinosus. *C. capite postice utrinque unispinoso.*

Sucker with the head armed on each side the back part with a single spine.

Cyclopterus nudus. *C. corpore nudo, capite postice utrinque unispinoso.* *Lin. Syst. Nat. p. 414.*

A SMALL species: described by Linnæus in the *Musæum Adolphi Frederici*. Native of India.

SMALL SUCKER.

Cyclopterus Minutus. *C. corpore nudo, rostro supra os tribus tuberculis inæquali.* *Lin. Gmel. Pall. spic. zool. 7. p. 12.*

Sucker with naked body, and snout marked above the mouth by three tubercles.

A VERY small species: allied in habit to the common Sucker: colour whitish; body compressed, with two white, unequal bony tubercles on each side: at the beginning of the back a long, attenuated, reclinate process: tail even: orb of adhesion hollow in the middle, oval, with a dilated edge with about seven lobes. Native of the Atlantic ocean.

CORNISH SUCKER.

- Cyclopterus Cornubicus*. *C. fusco-purpurascens, fronte producto.*
 Purplish-brown Sucker, with lengthened front.
Lepadogaster. *Gouan. pisc.* 177. *t.* 1. *f.* 6. 7.
 Lesser Sucking-Fish. *Borlase Cornw.* 269. *t.f.* 28.
Jura Sucker. *Penn. Brit. Zool.*

LENGTH about four inches: skin without scales, slippery, and of a dusky colour: the body taper, the nose growing slender from the head, and ending round: the teeth small: before each eye a small filament: behind the eyes two semilunar marks: in the middle of the back an oval mark, formed by small dots of a whitish colour: dorsal fin near the tail, and consisting of eleven rays: anal fin opposite, nine-rayed: ventral four-rayed, the rays joined by an intervening membrane with an oval depression in the middle: beyond that another strong membrane with a similar depression. Native of the European seas: found by Dr. Borlase on the coast of *Cornwall*, and by Mr. Pennant in the Sound of *Jura*. Dr. Borlase describes his specimen as of a purple colour.

BIMACULATED SUCKER.

Cyclopterus Bimaculatus. *C. roseus, macula utrinque ventrali nigra.*

Rose-coloured Sucker, with a black spot on each side the abdomen.

Bimaculated Sucker. *Penn. Brit. Zool.*

A VERY small species: head flat, and tumid on each side: body taper: pectoral fins placed unusually high: dorsal fin single, and placed low, or near the tail, which is even at the end: colour of the head and body bright pink; of the fins whitish: on each side the engine of adherence on the belly is a round black spot. Native of the European seas: observed near Weymouth.

SPOTTED FILE-FISH



Jackson sub.



UNICORN FILE-FISH.

BALISTES. FILE-FISH.

Generic Character.

<i>Dentes</i> plures in maxilla utraque.	<i>Teeth</i> several in both jaws.
<i>Corpus</i> compressum, abdomine carinato.	<i>Body</i> compressed : abdomen carinated.
<i>Cutis</i> coriacea, scabra, sæpe squamis coadunatis reticulata.	<i>Skin</i> tough, often reticulated by scale-like divisions.

UNICORN FILE-FISH.

Balistes Monoceros. *B. griseus, fusco variatus, radio super caput longo, acuminato, postice serrato.*

Grey File-Fish, variegated with brown, and furnished over the head with a long, sharp-pointed ray serrated behind.

Balistes Monoceros. *B. pinna capitis uniradiata, radiis caudalibus carinatis. Lin. Syst. Nat.*

Balistes unicornu, radiis quinquaginta in pinna ani. *Bloch. t. 147.*

THIS species grows to a considerable size, often exceeding the length of two feet: the body is of an oval shape, and, like most others of this genus, it possesses the power of inflating at pleasure the sides of the abdomen, by means of a pair of bony processes within that part: the skin is every where covered with very minute spines, and the general

colour is grey, inclining to brown on the upper parts, and varied with irregular, dusky, subtransverse undulations and spots: immediately over the head, just above the eyes, is a very strong single, and slightly recurved spine of considerable length, and serrated on the hind part: the dorsal fin commences at some distance beyond this, and is rather shallow, reaching to within a small distance of the tail, which is of an oval or slightly rounded shape: the anal fin is placed opposite the dorsal and is of similar form: the pectoral are small and rounded: the ventral consist of a pair of concealed, rough bony processes: both fins and tail are of a pale brown colour, the latter marked by a few dusky bars. This fish is a native of the Indian and American seas, feeding chiefly on crustaceous and testaceous marine animals. In the North-American seas is found a variety, of a larger size, and variegated with red and blue streaks: this, according to Catesby, is esteemed a poisonous fish.

HISPID FILE-FISH.

Balistes Hispidus. *B. pinna capitis uniradiata, rostro subulato, pinna caudæ ocello nigro.* *Lin. Syst. Nat.*

Spotted File-Fish, with subulate snout, and a black spot on the tail-fin.

Balistes varius, dorso monacantho, &c. *Seb. mus. 3. p. 106. t. 34. f. 2.*

LENGTH about three inches: shape oval: snout produced into a tubular form: colour pale yellow-

brown, varied with numerous ocellated or areolated dusky spots: at some distance beyond the top of the head a long serrated spine: ventral spines slightly projecting: tail rounded, and marked in the middle by a black spot: on each side the extremity of the body immediately adjoining to the tail are situated very numerous small recurved spines, to the number of an hundred on a side. Native of the American and Indian seas. The Indian variety is said by Commerson to be of a dusky or blackish colour.

DOWNY FILE-FISH.

Balistes Tomentosus. *B. abdomine ventricoso maculato, lateribus versus caudam hirsutis.*

File-Fish with spotted ventricose abdomen, and sides setaceous towards the tail.

Balistes tomentosus. *B. pinna capitis biradiata, corpore posteriorius subvillosa. Lin. Syst. Nat.*

LENGTH a few inches: shape broad oval, with the abdomen projecting greatly beyond the outline of the other parts: colour yellowish brown, the projecting abdomen being marked with numerous, small, dusky, semilunar streaks: ventral spines very strong: above the head a very strong and thick spine, serrated on the hind part: pectoral fins small: dorsal and anal opposite, and rather shallow: tail rounded; the extremity of the body immediately preceding it being furnished on each side with numerous, small, reversed spines: whole skin

rough with very small prickles, those on the abdomen giving it a kind of downy appearance. Native of the Indian seas.

PAPILLOSE FILE-FISH.

Balistes Papillosus. *B. pinna dorsali anteriore biradiata, corpore papilloso. Lin. Syst. Nat.*

File-Fish with two spines above the head, and body covered by granular papillæ.

Balistes granulatus. *B. pinna dorsali anteriore biradiata, corpore granoso. White's Journ. of Voy. to N. S. W. p. 254.*

LENGTH about four inches: colour grey: whole body roughened by minute papillæ or granules: above the head a very strong and thick serrated spine, with a smaller and shorter placed immediately behind it: pectoral fins lanceolate: dorsal and anal rather shallow, and placed opposite: ventral spines short and rough: tail slightly rounded. Native of the Indian and American seas: observed about the coasts of New Holland.

CHINESE FILE-FISH.

Balistes Chinensis. *B. cinereus maculis parvis aurantiiis, radio capitis unico, pinna ventrali unica.*

Cinereous File-Fish, with small orange spots, ray over the head single, and single ventral fin.

Balistes Sinensis. *B. radio in capite unico, pinna ventrali unica.*
Bloch. t. 152.

LENGTH a few inches: colour pale grey, with a cast of yellow-brown on the upper parts: sides marked with minute red spots: above the head a very strong serrated spine: ventral fin single, with the first ray strong and serrated: dorsal and anal fins rather shallow, and placed opposite: tail rounded: lateral line commencing behind the eyes, and curving downwards as it approaches the end of the body, which is beset, on each side the tail, with two rows of spines curving forwards, to the number of four in each row: skin rough with minute points, growing rather longer towards the tail. Native of the Indian seas about the Chinese coasts, and in the South-American seas about those of Brasil.

RINGENT FILE-FISH.

Balistes Ringens. *B. niger, cute in rhombos divisa.*

Black File-Fish, with the skin marked into rhombic divisions.

Balistes ringens. *B. pinna dorsali anteriore triradiata, lateribus capitis triplicatis, cauda bifida. Lin. Syst. Nat.*

Balistes pinna anali brevi, aculeis duobus in pinna dorsali prima. *Bloch. t. 152. f. 2.*

LENGTH ten or twelve inches: shape oval: colour entirely black, except a streak of blue along the base of each of the pectoral fins, and across the tail: skin strongly marked by cross lines into lozenges or scale-like squares: above the eyes a small fin, with two or three rays, the first very strong and serrated: dorsal and anal opposite: tail slightly lunated: teeth strong, and by their white colour forming a striking contrast with the jetty hue of the skin: eyes blue. Native of the Indian and American seas.

Var.

WHITE-FINNED FILE-FISH.

SIMILAR to the preceding, but with the pectoral, dorsal, and anal fins white, with a narrow black border: tail white at the base, the remainder orange-coloured. Observed about the coasts of Otaheitee by Capt. G. Tobin.

BLUE-STREAKED FILE-FISH.

Balistes liturosus. *B. elongatus niger, lituris cæruleis, spina capitis longissima, pinnis albis, caudæ fascia cærulea.*

Elongated black File-Fish, with blue streaks, very long spine over the head, and white fins, with a blue bar across the tail.

LENGTH nearly two feet: habit long and slender: colour jet-black, with numerous, abrupt, blue streaks in an obliquely longitudinal direction: fins and tail white; a blue bar across the latter: under jaw longer than the upper: over the eyes a very long, slender, black spine: along each side of the head, from the eyes to the mouth, a narrow white stripe: eyes yellow. Native of the Indian seas: observed about the coasts of Otaheitee by Captain G. Tobin.

SMOOTH FILE-FISH.

Balistes lævis. *B. subflavescens, antice fasciis longitudinalibus, postice transversis subcæruleis.*

Yellowish File-Fish, with longitudinal blueish bands on the fore-part, and transverse on the hind-part.

Balistes corpore lævi. *Bloch. t. 414.*

LENGTH about twelve inches: habit rather lengthened: skin smooth: colour pale yellowish brown, marked on the fore-parts by four or five longitudinal pale-blue stripes reaching to the middle of the body, and on the hind by several transverse stripes of similar colour: on the stripes, as well as on the other parts of the skin, are several small black spots:

dorsal and anal fin placed opposite: tail large, oval, and of a blackish cast: the rest of the fins pale: ventral spines not apparent: above the eyes a single smooth spine of moderate length. Native of the Indian seas.

SONNERAT'S FILE-FISH.

Balistes Sonneratii. *B. griseus, thorace subtus albido, fascia utrinque lunata nigra.*

Grey File-Fish, with the thorax whitish beneath, and marked on each side by a black crescent.

Le Baliste Bourse, *Cepede,*

LENGTH from six to ten inches: shape ovate: colour grey-brown above, and blueish white beneath from the mouth to the beginning of the ventral fin, the two colours being separated by a line of white: skin rough: fin above the head consisting of four or five rays, united by a membrane: the first ray stronger than the rest: on each side the head, crossing the eyes, a black crescent, passing downwards as far as the base of the pectoral fin: the horns pointing backwards: beyond this an oblong, slightly forked spot: dorsal and anal fin placed opposite, and of a white colour: ventral spines rough, slightly prominent, and black, the colour being continued along the lower part between them and the vent: tail nearly even. Native of the Indian seas: observed by Sonnerat about the coasts of the Isle of France: by Capt. G. Tobin about those of Otaheitee.



PATCHED FILE-FISH



Each side.

MEDITERRANEAN FILE-FISH. *var.*

PATCHED FILE-FISH.

Balistes Bicolor; *B. niger, maculis magnis albis.*

Black File-Fish, with large white spots.

Balistes Americanus. *Lin. Gmel. p. 1473 ?*

LENGTH about ten inches: shape broad oval, or similar to that of the ringent file-fish: colour black, or very deep brown, marked about the lower or under parts by numerous large ovate white or yellowish-white spots, of unequal size: in some parts, as about the breast and towards the tail, the spots are more or less confluent so as to form abrupt bands: across the head, from eye to eye, a white band or crescent: mouth edged by two concentric white bands, of which the first is broadest: dorsal and anal fin white or pale: tail rounded, and tipped by a broad white band: fin above the head consisting of two or three rays united by a membrane; the first ray very thick, rough, and much depressed: ventral processes of similar appearance: skin marked into squares as in the *B. ringens*: teeth strong and white. Native of the Indian seas. An elegant specimen is preserved in the Leverian Museum.

GREENISH FILE-FISH,

Balistes Virescens. *B. virescens, nigro-punctatus.*

Greenish File-Fish, speckled with black.

Le Baliste verdâtre. *Cepede.*

A LARGE species: habit similar to that of the preceding species: colour greenish, with a tinge of brown and yellow on different parts: skin marked into large squares, each of which has a dusky spot in the centre: sides of the head deep gold-colour; the top of a blackish blue, with small yellow specks: lower part of the head, and breast, of a pale blue: from the eyes to the base of the pectoral fins an indistinct blackish band: fins and tail whitish, edged with black: pectoral fins tipped with yellow: tail rounded: extremities of the body beset with four longitudinal rows of small reversed prickles or spines: from the ventral processes to the vent a double row of short spines: teeth strong: first dorsal fin, or that situated above and beyond the head consisting of three or four rays united by a membrane; the first ray very strong and rough. Native of the Indian seas: observed by Sonnerat,

FASCIATED FILE-FISH.

Balistes Fasciatus. *B. flavus*, fascia utrinque obliqua nigra.

Yellow File-Fish, with an oblique black band on each side.

Baliste echarpe. *Cepede*.

SHAPE rhombic-ovate, very slightly lengthened: colour of the upper parts pale yellow: head deep yellow: upper lip surrounded by a bright-blue band: across the body, but in an oblique direction, a broad black band, including the eyes, and passing to the base of the anal fin: end of the body on each side marked by a large black triangle, pointing forwards: in the area of this triangle are placed three or four longitudinal rows of small spines: first or small dorsal fin situated beyond the eyes, and consisting of three rays with a membrane; the first ray very thick, and rough: ventral spines of similar appearance: pectoral fins, second dorsal, anal, and caudal pale, but the pectoral marked by a red spot: it is also to be observed, that the extremity of the body or base of the tail is surrounded by a black band; that the lower parts of the body are of a red-brown colour, and that a narrow pale-blue stripe descends from the front of each eye to the base of the pectoral fins, forming an accompaniment to the broad black band before mentioned. This beautiful species is a native of the Indian seas, and is described by *Cepede* from the MSS. of *Sonnerat*, but without any mention of the size.

SINGLE-SPOTTED FILE-FISH.

Balistes Unimaculatus. B. viridis, macula utrinque magna nigra, abdomine albo.

Green File-Fish, with a large black spot on each side, and white abdomen.

Le Baliste Pralin. *Cepede.*

SIZE of a Perch: colour deep green above, white beneath: on each side the body a very large black spot: from the snout to the base of the pectoral fins on each side a purple stripe: and from the base of the pectoral fins to the eye five stripes, of which the middle and two exterior are blueish, and the two others reddish: pectoral fins red; edges of the tail yellow: head large, measuring nearly a third of the whole fish: lips somewhat extensile; first or small dorsal fin three-rayed: native of the Indian seas: observed by Sonnerat; said to be esteemed as a food, and to frequent rocky places.

 CINEREOUS FILE-FISH.

Balistes Cinereus. B. cinereus, fascia utrinque thoracica nigra, tribusque lunatis cæruleis prope caudam.

Cinereous File-Fish, marked on each side by a black thoracic band, and by three lunated blue bands near the tail.

Le Baliste cendré. *Cepede.*

SIZE large: habit similar to that of *B. Monoceros*: small dorsal fin consisting of three rays: the first strong and rough; dorsal and anal fin op-

posite: on each side the extremity of the body two transverse rows of short spines: tail slightly lunated. Native of the Indian seas: observed by Comerson.

MEDITERRANEAN FILE-FISH.

Balistes Capriscus. *B. griseo-violaceus, rubro-ceruleove variatus, pinna ventrali solitaria, cauda rotundata.*

Violet-grey File-Fish, with red or blue variegations, single ventral fin, and rounded tail.

Balistes Capriscus. *B. dorso triacantho, squamis undique aculeatis.* *Seb. mus.* 3. p. 63. t. 24. f. 16.

Capriscus. *Aldr. Gesn. Rondel. Jonst. Will. &c.*

LENGTH from one to two feet: shape ovate, as in the *Balistes Vetula*: general colour violaceous grey, sometimes variegated both on the body and fins with blue or red spots: irides yellow: pupils blue: first or small dorsal fin furnished with three or four rays; the first of which is very strong: tail rounded. Native of the American, Indian, and Mediterranean seas. This is almost the only species of the genus *Balistes* that is found in the European seas, and has in consequence been described by most Ichthyologists. The peculiar structure of the first or small dorsal fin is well observed by Salvian, who remarks that the bones or rays are so contrived as to act in concert with considerable force in suddenly elevating the fin at the pleasure of the animal; and though the foremost or largest be pressed never so hard, it will not stir; but if the last or least of all be pressed never so slightly, the other

two immediately fall down with it ; as a cross-bow is let off by pulling down the trigger. For this reason the fish is called at Rome by the name of *Pesce Balestra*.

ANCIENT FILE-FISH.

Balistes Vetula. *B. olivaceo-flavescens, capite lineis cæruleis variato, pinna ventrali solitaria, cauda lunata.*

Olivaceous-yellowish File-Fish, with head varied by blue streaks, single ventral fin, and forked tail.

Balistes Vetula. *B. pinna dorsali anteriore triradiata, ventrali longitudinali, caudali bifida. Lin. Syst. Nat.*

Guaperva maxime caudata. *Will. ichth. app. 21. t. I. 23.*

LENGTH from one to two feet or more : shape subrhombic ovate : general colour yellowish olive, paler beneath : from the eye to the upper parts of the head and front run several blue streaks, one or two are also drawn from beneath the eye towards the pectoral fins ; and the cheeks are marked by others which curve slightly downwards : a few short obliquely transverse stripes pass along the sides of the back, others across the extremity of the body, and others near the base of the anal fin : the colour of the fins is pale brown with numerous violaceous transverse stripes : the first or small dorsal has three rays, the first of which is extremely strong and rough : beneath the abdomen is placed a single ventral fin, with the first ray strong and hispid : the second dorsal, as well as the anal fin, is broad and falcated : the tail is large, very strongly lunated, and edged with blue : on each side the abdomen,

above the base of the ventral fin, are three or four parallel longitudinal rows of short spines: the skin is every where marked into scale-like divisions. Native of the Indian and American seas. It is supposed to have obtained its popular title of the Old Wife Fish from the appearance of the mouth when viewed in front, as well as from the slightly murmuring noise which it utters when first taken.

SPOTTED FILE-FISH.

Balistes Maculatus. *B. subviolaceus, cæruleo maculatus, abdomine albid.*

Subviolaceous File-Fish, with blue spots and whitish abdomen. Balistes pinna anali lata, aculeis duobus in prima pinna dorsali.

Lin. Gmel. Bloch, t. 151.

SHAPE oval: length from one to two feet: colour pale violet, browner on the back, and pale or whitish beneath: skin strongly marked into lozenge-shaped reticulations: first dorsal fin three-rayed; the first very strong: ventral spines rough and but slightly projecting: tail somewhat convex in the middle of its outline, with falcated tips: whole body, dorsal, and anal fin marked with numerous round, blue spots. Native of the Indian and American seas.

ACULEATED FILE-FISH.

Balistes Aculeatus. B. ferrugineus, vertice thoracisque lateribus carulo-striatis, caudæ lateribus spinis recumbentibus.

Ferruginous File-Fish, with the top of the head and sides of the thorax streaked with blue, and the sides of the tail beset with rows of recumbent spines.

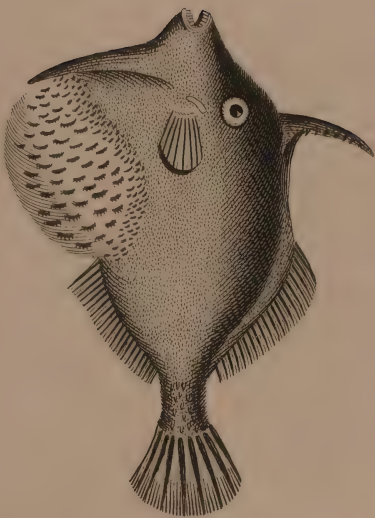
Balistes aculeatus. B. pinna dorsali anteriore triradiata; caudæ lateribus spinis recumbentibus. Lin. Syst. Nat. Bloch. t. 149.

SHAPE oval: length twelve or more inches: colour rufous brown, with a few purplish bands across the hinder part of the abdomen, and sometimes along the middle of the body: from the top of the eye to the crown four bright-blue lines, diverging in such a manner as to form a blue-striped lozenge on that part: from the bottom of the eye three or four longer lines of the same colour running as far as the pectoral fin; the space between the lines being blackish: skin rough, and strongly crossed into reticular squares: on each side the end of the body three longitudinal rows of spines: ventral processes very rough: first dorsal fin triradiate, with the first ray very rough: tail rounded: native of the Indian, American, and Red seas: varies in colour, and is sometimes of a gilded hue.

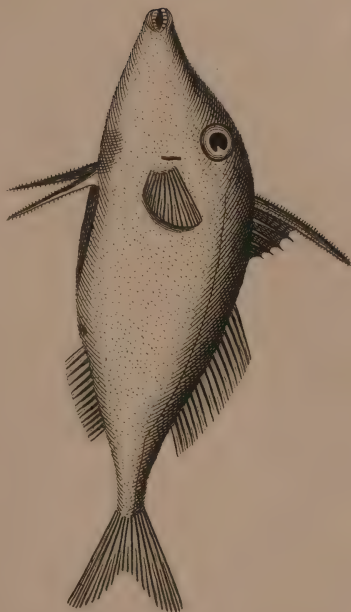
ACUTEATED FILE-FISH.



DOWNY FILE-FISH.



TWO-SPINED FILE-FISH.



Hill engr.

WARTED FILE-FISH.

Balistes Verrucosus. *B. pinna dorsali anteriore triradiata, cauda ordine triplici verrucarum.* *Lin. Syst. Nat.*

File-Fish with the first dorsal fin three-rayed, and a triple row of warts on each side the tail.

So closely allied to the *B. aculeatus* as to appear rather a variety of that species than truly distinct; the chief difference consisting in the extremities of the body being furnished on each side with three rows of warts rather than spines.

TWO-SPINED FILE-FISH.

Balistes Biaculeatus. *B. griseus, dorso fusco, spinis ventralibus elongatis acutis.*

Grey File-Fish, with dusky back, and elongated, sharp-pointed ventral spines.

Balistes biaculeatus. *B. aculeis in ventre binis.* *Lin. Gmel. Bloch. t. 148. f. 2.*

LENGTH six or eight inches: shape rather lengthened: colour dusky on the upper parts, whitish on the sides and abdomen: snout lengthened: skin roughened by very minute aculei: first or small dorsal fin blackish; four or five-rayed, the first ray strong, rough, and extending considerably beyond the rest: the other fins pale: tail forked: ventral spines very long, rough, and sharp-pointed. Native of the Indian seas.

FORCIPATED FILE-FISH.

Balistes Forcipatus. *B. cauda bifurca, pinna dorsi maculosa.*
Lin. Gmel.

File-Fish with forked tail, and spotted dorsal fin.

Guaperva cauda forcipata, pinnis maculosis. *Will. ichth. p. 90.*
t. I. 22.

LENGTH about sixteen inches: habit similar to that of *B. Vetula*, from which it hardly seems to be sufficiently distinct: skin marked into scale-like areæ: first dorsal fin three-rayed; the first ray extremely thick and strong: second dorsal fin and anal marked with numerous, small, round spots: tail forcipated: ventral processes rough, strong, and short. Native of the Indian seas.

 WHITE-SIDED FILE-FISH.

Balistes Signatus. *B. lividus, macula utrinque magna alba, pinnis albo marginatis.*

Livid File-Fish, with a large white spot on each side, and fins edged with white.

Baliste grand-tache. *Cepede.*

A LARGE species, equal in size to the *B. virescens*: colour livid brown, paler beneath: on each side the body a very large white spot: almost all the fins edged with white: on each side the head six longitudinal rows of warts: tail lunated, with very long tips. Native of the Indian seas: observed by Commerson.

SPECKLED FILE-FISH.

Balistes Punctatus. *B. supra cinereus albo punctatus, subtus albidus.*

Cinereous File-Fish speckled with white, beneath whitish.

Balistes punctatus. *B. corpore punctato.?* *Lin. Gmel.*

Baliste étoilé. Cope.

HABIT that of *Balistes maculatus*: skin marked into scale-like divisions: colour grey above, marked with numerous, small white spots: sides and abdomen whitish: first dorsal fin four-rayed; the first ray longest and thickest: second dorsal and anal streaked with whitish bars: pectoral process strong, and succeeded by a sort of finny continuation: tail slightly lunated. Native of the Indian seas.

 BRIDLED FILE-FISH.

Balistes Capistratus. *B. nigricans, ore capistro albido subtus duplicato.*

Blackish File-Fish, with the mouth surrounded by a whitish bridle doubled beneath.

Baliste bridé. Cope.

SHAPE subrhombic-ovate: colour dusky; mouth surrounded by a whitish band, produced on each side the head as far as the base of the pectoral fin: at some distance beneath the mouth is another band, joining the side stripe just mentioned, and forming a half collar beneath the chin: fins as in the *B. aculeatus*, *virescens*, &c. tail lunated. Native of the Indian seas: slightly described by Cope from the MSS. of Commerson.

KLEINIAN FILE-FISH.

Balistes Kleinii. *B. oblongiusculus*, *maxillis porrectis*, *radio dorsali primo utrinque scabro*, *ventrali nullo*. *Lin. Syst. Nat. Gmel.*
Somewhat oblong File-Fish, with extended jaws, first ray of first dorsal fin rough on both sides, and ventral fin wanting. *Capriscus capite triangulato*, &c. *Klein. misc. pisc. 3. p. 25.*

COLOUR whitish: body compressed: mouth small and bearded: teeth strong: in the second dorsal and anal fin more than forty-five rays: tail rounded. Native of the Indian seas.

 CURASSAO FILE-FISH.

Balistes Curassavicus. *B. radio dorsali anterieus scabro*, *ventrali humili retuso*, *cauda truncata*, *rostro obtuso*. *Lin. Gmel. Gronov. zooph. 196.*

File-Fish with the first dorsal ray rough in front, the ventral low and blunt, the tail truncated, and the snout obtuse.

ALLIED to *B. Capriscus*. Length of the specimen described three inches: colour yellow, with a black speck in each of the scales or divisions: back brown: tail even. Native of the seas about the Curassao islands.

FORSKAL'S FILE-FISH.

Balistes Assasi. *B. fuscus, subtus albidus, vertice nigro, striis transversis cæruleis, corpore verrucoso.*

Brown File-Fish, whitish beneath, with the top of the head black, marked by transverse blue lines, and warted body.

Balistes Assasi. *B. corpore verrucis fuscis muricato, cauda triplici nigrarum ordine, Lin. Gmel. Forsk. Arab. p. 75,*

LENGTH about a span; colour brown above, whitish beneath: top of the head marked by four transverse blue, and three alternate black stripes: lips yellow: from the mouth to the base of the pectoral fins on each side a ferruginous-brown line: from this to the eye a lanceolate black streak, in front of which is a yellow one, with a blueish edge: tail marked with an oblong white spot. Native of the Red sea: described by Forskal.

 UNDULATED FILE-FISH.

Balistes Undulatus. *B. corpore nigro lineis obliquis rubris undulato.*

Black File-Fish, with the body undulated by oblique red lines.
 Balistes undulatus. *B. pinna dorsali anteriore triradiata, caudæ lateribus spinis valde robustis recumbentibus, corpore nigro lineis rubris undulato. Lin. Trans. vol. 3. p. 37.*

NATIVE of the Indian seas: observed about the shores of Sumatra by Mr. Mungo Park: from the mouth to the base of the pectoral fins run three red lines, and the body is obliquely undulated by twelve lines of the same colour.

OSTRACION. TRUNK-FISH.

Generic Character.

<i>Dentes</i> porrecti, teretes, obtusiusculi.	<i>Teeth</i> pointing forwards, cylindric, rather blunt.
<i>Corpus</i> osse integro lorica-tum.	<i>Body</i> mailed by a bony covering.

TRIQUETRAL TRUNK-FISH.

Ostracion Triqueter. *O. trigonus, muticus.* *Lin. Syst. Nat.* p. 407.

Triangular-bodied, unarmed Trunk-Fish.

Ostracion triangularis muticus, tessulis convexis. *Bloch. t.* 130.

THE Ostracions or Trunk-Fishes are so strikingly distinguished by their bony crust or covering, that no difficulty can arise to the ichthyological student in referring them to their proper genus. The investigation of the species however demands a greater degree of attention, and such is the similarity between some of these, that it remains doubtful whether they should be considered as truly distinct, or as constituting mere sexual differences.

The triquetral Trunk-Fish measures about twelve inches in length, and is, as its name imports, of a trigonal shape, the sides sloping obliquely from

the ridge of the back, and the abdomen being flat: the whole animal, except to within a small distance from the tail, is completely enveloped in a bony covering, divided into well-defined hexagonal spaces, and covered (as in the whole genus) with a transparent epidermis like that of the Armadillo among quadrupeds: the usual colour is a subferruginous brown, with a white spot in the centre of each hexagon, which is also marked by fine rays diverging from the centre to the edges: the fins are yellowish, and the tail rounded; the naked part of the extremity of the body or base of the tail being marked with white specks, similar to those on the crustaceous part of the animal: the pectoral fins are rather small than large, and of a rounded shape: the dorsal and anal are also rather small, and are situated opposite each other towards the extremity of the body, and, like all the rest of the genus, this fish is destitute of ventral fins. It is a native of the Indian and American seas, and is supposed to feed on the smaller crustacea, shell-fish, and sea worms. It is said to be considered as an excellent fish for the table, and is held in high estimation among the East-Indians.

TRIGONAL TRUNK-FISH.

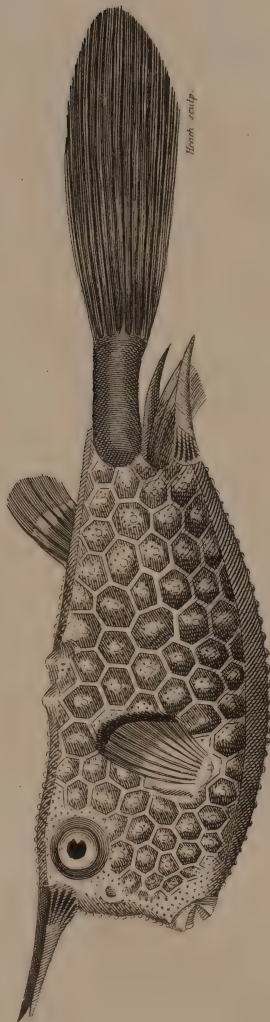
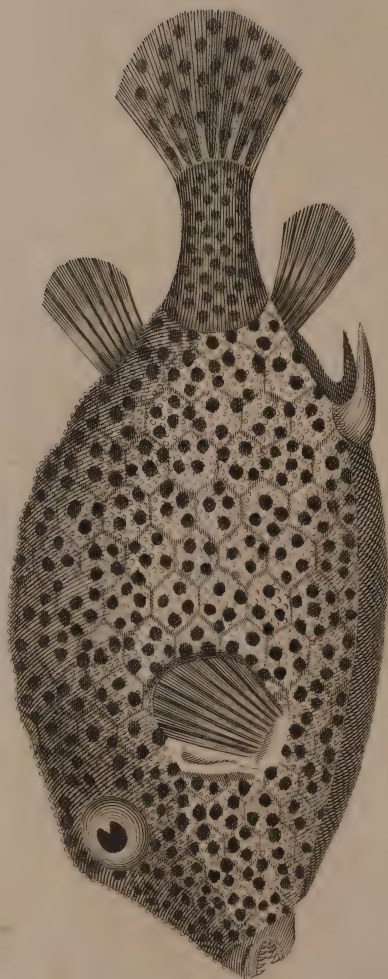
Ostracion Trigonus. *O. trigonus*, *spinis subcaudalibus duabus*,
pinna dorsali radiis quatuordecim. Lin. Syst. Nat.

Triangular-bodied Trunk-Fish, with two subcaudal spines, and
 fourteen rays in the dorsal fin.

Ostracion dorso arcuato, *pinna anali radiis duodecim.* Bloch.
 t. 135.

MUCH allied to the preceding in general appearance, but with the back more convex or of a rounder outline when viewed in profile: shield divided, as in the former species, into large hexagonal areæ, but marked with numerous small tubercles rather than streaks: towards the extremity of the body, a little before the anal fin, on each side the abdomen, a very strong, sharp-pointed, slightly curved and striated spine, directed towards the tail, which, as well as the fins, is shaped as in the preceding fish: the colour is a pale ferruginous brown, with pale or whitish fins. Native of the Indian seas: said to make a kind of grunting noise when first taken, owing to the sudden expulsion of air from its branchial orifices,

BIACULEATED TRUNK-FISH.



HORNED TRUNK-FISH.

Var. ?

BIAÇULEATED TRUNK-FISH.

Ostracion Biaculeatus. *O. trigonus*, *spinis subcaudalibus duabus*,
pinna dorsali radiis decem. Lin. Syst. Nat.

Triangular-bodied Trunk-Fish, with two subcaudal spines, and
 ten rays in the dorsal fin.

Ostracion bicaudalis. *O. triangularis*, *maculosus*, *aculeis binis*
subcaudalibus. Bloch. t. 132.

THIS, in all probability, is either a variety, or a sexual difference, of the former fish, from which it differs in being marked all over with numerous small black spots, and in having the spines smooth or not channeled as in the former fish. It is a native of the Indian seas.

 HORNEDED TRUNK-FISH.

Ostracion Cornutus. *O. tetragonus*, *spinis frontalibus subcaudalibusque binis.* Lin. Syst. Nat.

Quadrangular-bodied Trunk-Fish, with two frontal and two subcaudal spines.

Ostracion quadrangularis, *spinis quatuor.* Bloch. t. 133.

LENGTH eight or ten inches: shape squarish; broad and abrupt towards the head, and tapering considerably towards the hind part: back nearly strait: crust or mail strongly marked into large hexagons; from the top of the head project two strong, lengthened, sharp spines pointing strait forwards; and on each side the anal fin is a similar

spine pointing directly backwards: tail very large, long, and of an oval shape: colour of the whole animal yellow-brown, deeper beneath: tip of the tail dusky. Native of the Indian and American seas.

THREE-HORNED TRUNK-FISH.

Ostracion Tricornis. *O. trigonus, spinis frontalibus duabus, dorsali unica. Lin. Syst. Nat.*

Triangular-bodied Trunk-Fish, with two frontal spines, and one on the back near the tail.

Ostracion triangulatus, aculeis duabus in capite, & unico longiore superne ad caudam. *Artedi.*

LENGTH eight or ten inches: in front of the head two short, pointed spines directed forwards: above the naked part of the body, near the tail, a long, upright, pointed spine: shield divided into hexagons, each obscurely marked into triangular spaces: native of the Indian seas.

FOUR-HORNED TRUNK-FISH.

Ostracion Quadricornis. *O. trigonus, spinis frontalibus sub-caudalibusque binis. Lin. Syst. Nat.*

Triangular-bodied Trunk-Fish, with two frontal and two sub-caudal spines.

Ostracion triangularis, aculeis quatuor. *Bloch. t. 134.*

LENGTH twelve inches: shape subtrigonal; the back, when viewed in profile, strongly arched, and having a smooth outline: mail divided into large hex-

agons marked with numerous and very small tubercles: on the top of the head two very strong spines pointing forwards; and from the hind part of the abdomen, immediately before the anal fin, two more spines, pointing backwards: colour of the mailed part subviolaceous brown, with darker streaks irregularly dispersed over the whole: naked part of the body near the tail yellowish brown, marked with deep brown spots: fins and tail yellowish brown. Native of the Indian and American seas.

 PYRAMIDAL TRUNK-FISH.

Ostracion Turritus. *O. subtetragonus, spinis frontilibus duabus, dorso pyramidato, abdomine utrinque spinis quatuor.*

Subquadrangular-bodied Trunk-Fish, with two frontal spines, pyramidal back, and four spines on each side the abdomen.

Ostracion turritus. *O. subtetragonus, superciliis dorsoque spinis solitariis, abdomine utrinque quatuor.* Lin. Gmel. Forsk. Arab.

Ostracion quadrangularis, processu magno in dorso. Bloch. t. 136.

LENGTH ten or twelve inches: shape squarish, the back rising into a pyramidal protuberance, terminated by an extremely strong, short, sharp-pointed and striated spine, curving slightly backwards: above the eyes a pair of short and sharp spines: on each side the abdomen four strong, sharp, short, striated spines, curving slightly backwards: mail marked into numerous triangular spaces, the hexagonal or primary divisions being subdivided by radii from the centre to the sides:

colour yellowish brown, darkest on the back and abdomen : fins, tail, and spines lead-coloured. Native of the Indian and American seas.

CONCATENATED TRUNK-FISH.

Ostracion Concatenatus. *O. triangularis muticus, figuris concatenatis albidis.*

Triangular-bodied unarmed Trunk-Fish, with whitish concatenated variegations.

Ostracion concatenatus. *O. triangularis muticus, figuris catenulatis.* Bloch: t. 131.

HABIT similar to that of the trigonal and triangular Trunk-Fish, but with the back somewhat less elevated : mail marked into triangular, ovate, subquadrangular, and other-shaped spaces in a kind of reticular pattern : colour brown, the lines dividing the spaces being of a pale rose-colour : fore parts and abdomen of the same colour : end of the body brown : tail and fins pale brown. Native of the American seas.

SNOUTED TRUNK-FISH.

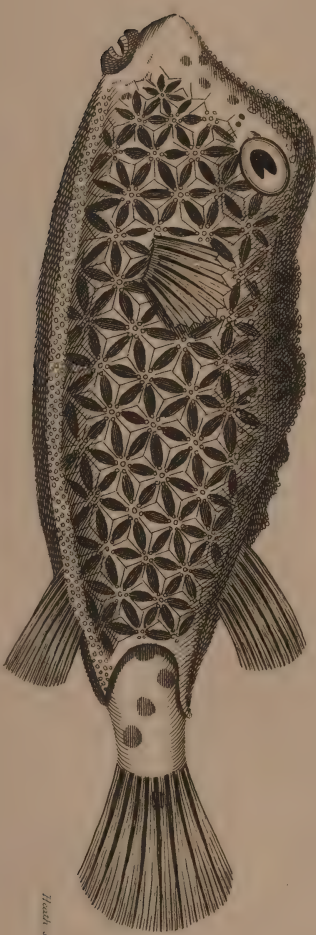
Ostracion Nasus. *O. subquadrangularis albidus, figuris concatenatis fuscis.*

Whitish subquadrangular-bodied Trunk-Fish, with brown concatenated variegations.

Ostracion. Nasus. *O. rostro nasiformi.* Bloch. t. 138.

HABIT approaching to that of the preceding species, but more slender : head very convex over

PYRAMIDAL TRUNK-FISH.



Woods sculp.

SPOTTED TRUNK-FISH.

Woods sculp. London Published by G. Knapley, Fleet Street.

the eyes, sloping downwards, and rounded off in front into an obtuse snout, beneath which is situated the mouth: colour greenish white or ash, with the mail marked into very large hexagons by means of broad, ovate-lanceolate, blackish lines, with similar ones radiating from the centre of the hexagons, to the number of five in each, and thus elegantly dividing the whole into triangles, with finer lines or margins accompanying each: naked or projecting part of the body, towards the tail, marked with round black spots: fins and tail reddish brown. Native of the Indian and American seas.

CUBIC TRUNK-FISH.

Ostracion Cubicus. *O. tetragonus muticus, punctis albis nigro marginatis.*

Quadrangular-bodied Trunk-Fish, with white specks edged with black.

Ostracion cubicus. *O. tetragonus muticus, lateribus planiusculis.* *Lin. Syst. Nat.*

O. quadrangular. ocellatus. Bloch. t. 137.

HABIT somewhat resembling that of *O. triqueter*, &c. but with the body square: mail marked into tuberculated hexagons, each of which has a white or blueish central spot, surrounded with a darker border: ground colour of the whole mailed part pale yellowish brown: of the naked or projecting part towards the tail yellow-brown, with a few dusky variegations: tail and fins reddish brown. Native of the Indian seas, and said to be an excellent fish for the table, and to be kept for that pur-

pose in reservoirs, growing, according to Renard, so familiar as to come at a given signal to the surface of the water, and take its food from the hand.

SPECKLED TRUNK-FISH.

Ostracion Meleagris. *O. tetragonus, nigro-fuscus, albo-punctatus.*

Quadrangular bodied blackish-brown Trunk-Fish, speckled with white.

Ostracion Meleagris. *Nat. Misc. 7. t. 253.*

LENGTH from six to eight inches : habit similar to that of the *O. cubicus*, being of the same square shape : mail divided into hexagons, and of a deep blackish chesnut-colour, each division being marked with numerous, small, white spots : naked or projecting part of the body marked in the same manner : fins and tail whitish, with chesnut-coloured rays : eyes white : native of the Indian seas : observed during Captain Cook's voyages about the coasts of New-Holland, Otaheitee, &c.

SPECKLED TRUNK FISH.

*Thalassoma lineare*



Muraena helcon.

EARED TRUNK-FISH.

EARED TRUNK-FISH.

Ostracion Auritus. *O. fuscus, spina utrinque supraoculari, duabus utrinque dorsalibus, duabus ventralibus, unica laterali.*

Brown Trunk-Fish, with a spine over each eye, two on each side the back and abdomen, and one on each side the body.

Ostracion auritus. *Nat. Misc. t. 338.*

HABIT thick, broad, and short, with the back very convex: shape slightly subtriangular: above each eye a very strong, thick, sharp-pointed spine, curving backwards, so as to give the resemblance of a pair of ears: on each side the middle of the ridge of the back two others of similar appearance: on each side the abdomen two more, and on each side the middle of the body a single spine, shorter than the rest: colour of the whole animal deep brown, except the spines and fins, which are pale: length of the specimen described about four inches and a half: pectoral fins somewhat lanceolate: tail nearly even, but with a slight approach towards a lunated shape. Native of the Indian seas: observed during the voyages of Captain Cook, and preserved in the British Museum.

STRIPED TRUNK-FISH.

Ostracion Striatus. *O. cæruleo flavoque lineatus, spina utrinque supraoculari, duabus utrinque dorsalibus ventralibusque, unica laterali.*

Trunk-Fish with yellow and blue stripes, and spine over each eye, two on each side the back and abdomen, and one on each side the body.

SIZE and habit of the preceding fish: colour a beautiful variation of bright blue and yellow, in the form of lines disposed in different directions, but principally in a longitudinal one, over the whole fish: above each eye a strong spine as in the former: on the ridge of the back two pair, disposed as in that species; and on each side the abdomen three, the middle of which is higher than the rest: fins and tail pale blue, the dorsal and anal fin blue and yellow at the base, and the tail (which is slightly lunated), edged with yellow: all the spines are of a blue colour. Whether this fish be a sexual difference of the preceding, or a distinct species, may perhaps be doubted. It may also be added that the *Eared Trunk-Fish* may in reality be no other than the present animal, changed entirely in colour from having been long preserved in spirits of wine. Described from a drawing by Captain G. Tobin, by whom it was observed about the coasts of Adventure Bay in Van Dieman's Land.

TUBERCULATED TRUNK-FISH.

Ostracion Tuberculatus. *O. tetragonus muticus, tuberculis dorsalibus quatuor.* Lin. Syst. Nat.

Quadrangular-bodied unarmed Trunk-Fish, with four dorsal tubercles.

O. quadrangulus, tuberculis quatuor majoribus in dorso. Artedi.

NATIVE of the African seas: perhaps a mere variety of the *O. triqueter*.

 GIBBOSE TRUNK-FISH.

Ostracion Gibbosus. *O. tetragonus muticus gibbosus.* Lin. Syst. Nat.

Quadrangular-bodied unarmed gibbose Trunk-Fish.

Ostracion quadrangulus gibbosus. Artedi.

NATIVE of the Indian seas: supposed by Gronovius to be a variety of the *Ostracion triqueter*.

DIODON. DIODON.

Generic Character.

<i>Marillæ</i> osseæ, indivisæ.	<i>Jaws</i> bony, undivided.
<i>Corpus</i> spinis mobilibus adspersum.	<i>Body</i> beset with moveable spines.

PORCUPINE DIODON.

Diodon Hystrix. *D. sphericus, aculeis triquetris.*

Spherical-bodied Diodon, with triangular spines.

Diodon Atinga. *Lin. Syst. Nat.*

Hystrix Piscis, seu Orbis echinatus major. *Seb. mus. 3. t. 23.*

f. 1. 2.

Diodon Hystrix. *Bloch. t. 126.*

IN point of habit or external appearance the remarkable genus Diodon may be said to connect in some degree the tribe of fishes with that of the spiny quadrupeds, such as the Porcupines and Hedgehogs: it is also allied in a similar manner to the Echini or Sea-Urchins.

The Diodon Hystrix, commonly termed the Sea-Porcupine, is a species of considerable size, sometimes measuring not less than two feet in length: its usual form is nearly spherical, but it possesses the power of inflating or contracting itself at pleasure by means of an internal skin or membrane situated beneath the exterior or spiny covering:



Illustration

PORCUPINE DIODON.

1804, June 1. London, Published by G. Kearsley, Fleet Street.

its colour is a pale or whitish grey, the back being of a somewhat deeper cast; and the whole body is marked, at the base of each spine, by a round black spot: the fins themselves are also spotted. This fish is said to afford an amusing spectacle when taken by a line and hook, properly baited with some small species of crab, or other crustaceous animal: after having played round the bait for some time in various directions, it seizes it with a sudden spring; but finding itself hooked, it exhibits every appearance of the most violent rage; inflating its body and elevating its spines to the highest possible degree, as if endeavouring to wound in all directions; till, after having tired itself by its vain efforts, it suddenly expels the air from its body and becomes entirely flaccid for some time: but, when drawn towards the shore, redoubles its rage, and again inflates its body: in this state it is left on the sand; it being impossible to touch it without danger till it is dead. It is a native of the Indian and American seas, and is considered as a coarse and worthless fish, but is sometimes eaten by the inhabitants of the West-Indian islands. It varies as to the length of its spines in different individuals.

OBLONG DIODON.

Diodon Atinga. *Diodon oblongus, aculeis teretibus.*

Oblong Diodon, with round spines.

Diodon Hystrix. *Lin. Syst. Nat.*

Diodon Atinga. *Bloch. t. 125.*

THIS species is much allied to the preceding, but differs in being of a more lengthened shape, and in having the spines rather round than triangular: its general colour is grey, deeper on the back, and with a cast of pink on the lower parts: the whole body is marked, as well as the fins, by numerous round, black spots as in the former species: it arrives at the length of twelve or fifteen inches, and in its general manner of life resembles the Porcupine Diodon. It is considered as a poisonous fish, unless very carefully cleaned, and, according to Piso, if the least quantity of the gall should happen to mix with the flesh, it produces the most violent symptoms; the tongue becomes immoveable, the limbs stiffen, and a cold sweat ensues; followed by certain death, unless the poison be fortunately expelled by immediate medical aid. The Oblong Diodon is a native of the Indian and American seas.

ROUND DIODON.

Diodon Orbicularis. *D. corpore rotundo, aculeis brevibus.*
Bloch, t. 127.

Diodon with round body and short spines.

Diodon Atinga. *Var. β. γ. Lin. Syst. Nat.*

LENGTH nine or ten inches: shape almost perfectly spherical: spines strong, short, with broad bases forming the appearance of a kind of reticular pattern on the skin: colour rufous-brown above, paler beneath: native of the tropical seas: considered as a poisonous fish.

 PLUMIER'S DIODON.

Diodon Plumieri. *D. elongatus subcæruleus, albo-maculatus,*
collo coarctato.

Elongated blueish Diodon, with white spots, and contracted neck.

Diodon Plumier. *Cepede.*

VERY nearly allied to the Oblong Diodon, but considered by Cepede, who describes it on the authority of a drawing by Father Plumier, as a distinct species: body longer than in the former fish: behind the head a considerable stricture, resembling a kind of short neck: colour blueish, with numerous, small, round, white spots: native of the American seas in the warmer latitudes.

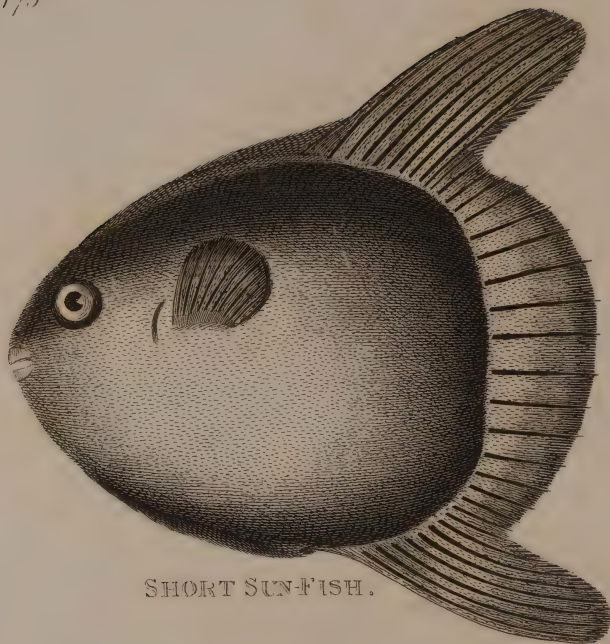
PATCHED DIODON.

Diodon Liturosus. *D. subfuscus, supra lituris nigris, subtus albidus.*

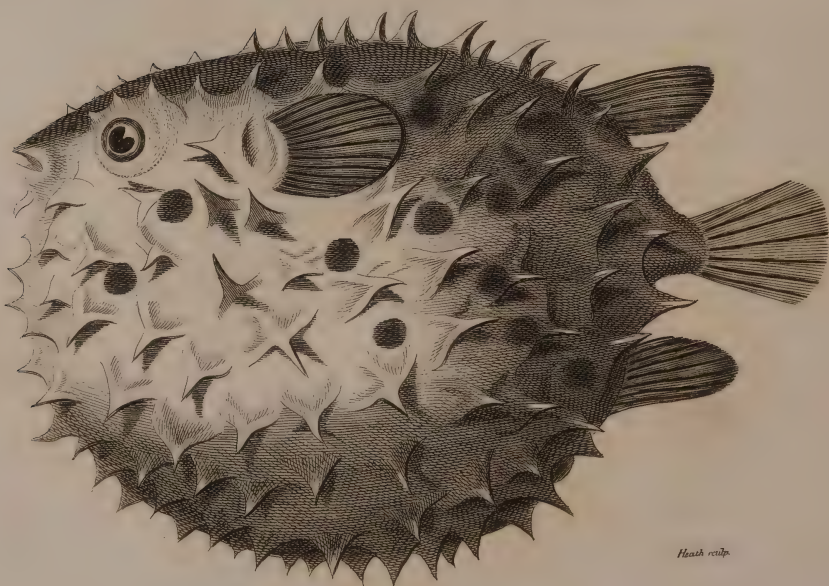
Brownish Diodon, whitish beneath, and marked on the upper part with black patches.

Diodon tacheté. *Cepede.*

SHAPE more approaching to globular than oblong: colour brown above, whitish beneath: on the nape a large, crescent-shaped black spot or patch, with the points toward the eyes: on each side the body a somewhat oval patch, situated above the pectoral fin, and two transverse ones, the first situated beneath the eye, the second between the eye and the pectoral fin: throat marked by a dusky cloud, and on the back a round spot encircling the dorsal fin: spines white, with brown tips, and considerably longer on the back than towards the abdomen: all the fins greenish yellow. Native of the Indian seas: observed by Commerson.



SHORT SUN-FISH.

*Haas sculp.*

ROUND DIODON.

CEPHALUS. SUN-FISH.

Generic Character.

<i>Maxillæ</i> osseæ.	<i>Jaws</i> bony.
<i>Corpus</i> ovatum, postice truncatum, caput piscis simulans.	<i>Body</i> terminating abruptly, so as to resemble the head of a fish.

SHORT SUN-FISH.

Cephalus Brevis. *C. corpore suborbiculato.*

Sun-Fish with suborbicular body.

Tetrodon Mola. *T. levis compressus, cauda truncata, pinna brevissima dorsali analique annexa.* *Lin. Syst. Nat.*

Mola. Sun-Fish. *Will. ichth. p. 151.*

Short *Diodon.* *Penn. Brit. Zool.*

Diodon Mola. *Bloch. t. 128.*

THE present genus is very strikingly distinguished by its unusual shape: the species composing it have hitherto been united with those of the genera of *Diodon* and *Tetrodon*. This led to great confusion, on account of an error in the *Systema Naturæ*, in which the Short Sun-Fish was referred to the genus *Tetrodon* instead of *Diodon*, in which latter, according to the Linnæan principles of arrangement, it should have been placed. Another species, described by Dr. Pallas, was also introduced into the Gmelinian edition of the *Systema Naturæ* under the name *Diodon Mola*; so that the restor-

ing the Short Sun-Fish, even under a different title, to its true Linnæan genus would but have increased the confusion. I therefore thought it advisable to place the Sun-Fishes in a distinct genus.

The Short Sun-Fish is a native of the European seas, and from the singularity of its aspect has long since attracted the particular observation of naturalists: its general appearance rather represents the head of some large fish than a complete animal; the body being very short and broad, and terminating abruptly on the hind part, where it is edged by a shallow fin: the general colour is brown with a silvery cast on the sides and abdomen: the skin is rough: the pectoral fins small, rounded, and placed horizontally: the dorsal and anal fins are placed opposite, and are of a slightly lengthened shape, with rounded tips continued into the tail fin. This fish is sometimes observed to lie on its side, on the surface of the water, in which state it is taken without difficulty: it arrives at a vast size in the northern seas, and is said to have been found of the length of eight, or even ten feet, and of the weight of five hundred pounds: it is supposed to feed principally on shell-fish, and is said to exhibit during the night a high degree of phosphoric splendor.



Head scale.

OBLONG SUN-FISH.

1804, June 1. London, Published by G. Kearney, Fleet Street.

OBLONG SUN-FISH.

Cephalus Oblongus. *C. corpore oblongo, truncato.*

Sun-Fish with oblong, truncated body.

Tetrodon truncatus. *Var. β. Tetr. Molæ. Lin. Gmel.*

Oblong Diodon. *Penn. Brit. Zool.*

MUCH allied to the preceding species, but of a more lengthened shape; resembling a Bream or some deep fish cut off in the middle: the colour of the back is dusky with some variegations: the abdomen silvery, and between the eyes and the pectoral fins are a few dusky streaks pointing downwards. It has been supposed by some however that the oblong Sun-Fish is in reality rather a variety of the preceding, or a sexual difference, than a distinct species: Cope in particular affirms that, on examining several specimens, he has observed intermediate gradations between the oblong and the short Sun-Fish.

 VARIEGATED SUN-FISH.

Cephalus Varius. *C. corpore fasciis undulatis maculisque albidis variato.*

Sun-Fish with the body variegated by whitish undulations and spots.

SIMILAR in proportions and general appearance to the Oblong Sun-fish, but distinguished by a different distribution of colours; the whole body being marked by numerous undulations of a lighter colour than

the rest of the skin, intermixed, towards the hind part especially, with numerous pale spots. This also is probably a variety of the oblong Sun-Fish, and is mentioned by Cope from the MSS. and drawings of Commerson, who observed it in the Indian seas.

PALLASIAN SUN-FISH.

Cephalus Pallasianus. *C. argenteus*, dorso subfusco, abdomine carinato spinoso.

Silvery Sun-Fish, with brownish back, and spiny carinated abdomen.

Diodon Mola. *D. verticaliter semiovalis*, posterius fere truncatus, ventre carinato semidiscoideo. *Lin. Gmel. Pull. spic. zool.* 8. p. 39.

SIMILAR in point of habit to the two preceding, having a thin body and a lengthened semi-oval shape: size of the specimen observed by Pallas not exceeding a few inches: colour silvery, with dusky back: mouth prominent: jaws rather cartilaginous than osseous: back armed with two spines and three tubercles: near the throat two spines, and some others on each side the carina of the abdomen: pectoral fins furnished with fourteen rays. Native of the tropical seas.



OCELLATED TETRADON.

Head only.

HARE TETRADON.

TETRODON. TETRODON.

Generic Character.

<i>Maxillæ</i> osseæ, apice divisæ.	<i>Jaws</i> bony, divided at the tip.
<i>Corpus</i> subtus muricatum.	<i>Body</i> roughened beneath.
<i>Pinnæ ventrales</i> nullæ.	<i>Ventral fins</i> wanting.

HARE TETRODON.

Tetrodon Lagocephalus. *T. abdomine spinis radiatis aculeato.*

Tetrodon with the abdomen aculeated by radiated spines.

Tetrodon lagocephalus. *T. abdomine aculeato, corpore lævi, humeris prominentibus.* *Lin. Syst. Nat.*

Tetrodon aculeis stellas in ventre efformantibus. *Bloch. t. 140.*

Globe Diodon. *Penn. Brit. Zool.*

THE fishes of this genus, like the Diodons, have the power of inflating their body at pleasure, by means of an internal membrane for that purpose, and during the time of inflation the small spines dispersed over their sides and abdomen are raised in such a manner as to operate as a defence against their enemies: they are chiefly natives of the tropical seas, though sometimes seen in the higher northern and southern latitudes, and are supposed to live principally on the crustaceous and testaceous animals.

The present species grows to the length of about

twelve inches, and is of a thick form in front, the hinder parts tapering suddenly towards the tail: the colour is yellowish brown above, and whitish with a slight silvery cast beneath: across the back are several short black or dark-brown bars of different sizes, and over the sides are dispersed many round blackish spots: the sides and abdomen are beset with very numerous, short, radiated spines: the fins are small; the dorsal and anal placed opposite each other, and the tail slightly rounded. This species is a native of the Indian and American seas, but occasionally strays into the northern latitudes, and has been taken, according to Mr. Pennant, about the British coasts, viz. near Penzance in Cornwall. It has the power of inflating the abdomen to a vast size: the Linnæan title seems to have been given from a fancied resemblance which the fore-part of the head bears to that of a hare.

LINEATED TETRODON.

Tetrodon Lineatus. *T. abdomine fasciis longitudinalibus fuscis variato.*

. Tetrodon with the abdomen variegated by longitudinal brown bands.

Tetrodon lineatus. *T. fasciis longitudinalibus fuscis pallidisque.*
Lin. Syst. Nat.

Tetrodon ventre prominente, fronte elevata. *Bloch. t. 141.*

. LENGTH ten or twelve inches: shape somewhat square, but when inflated resembling that of the *T. lagocephalus*: whole body beset with numerous

small spines: colour grey on the abdomen, with numerous, longitudinal, deep-brown streaks: fins and tail as in the preceding species. Native of the Mediterranean and American seas: sometimes found in the river Nile, where Hasselquist was assured by the fishermen that on being taken the hands were stung in the same manner as with nettles.

HISPID TETRODON.

Tetrodon Hispidus. *T. totus hispidus papillis setaceis.*

Tetrodon entirely hispid with bristly papillæ.

Tetrodon ventre prominente, fronte plana. *Bloch. t. 142.*

LENGTH two feet; shape, when inflated, similar to that of the *T. lagocephalus*: colour whitish, with the upper parts marked across the back by three or four semi-decurrent brown bands, dividing somewhat irregularly over the sides at their termination: whole body beset with numerous small spines, as in the two preceding species. Native of the Mediterranean and Indian seas: according to Belon it may be numbered among edible fishes. The fossil remains of this species are said to occur among the petrifications of Mount Bolca near Verona.

TORTOISE-SHELL TETRODON.

Tetrodon Testudineus. *T. supra fusco-ferrugineus cæruleo maculatus, subtus cærulescens, fasciis longitudinalibus fuscis.*

Ferruginous-brown Tetrodon with blue spots, beneath blueish with longitudinal brown bands.

Tetrodon testudineus. *T. abdomine plano leviore, dorso suturis curvis albis picto. Lin. Syst. Nat.*

Tetrodon corpore oblongo, maxilla superiore longiore. *Bloch. t. 139.*

LENGTH two feet: shape lengthened: colour rufous brown above, marked by numerous round, pale-blue spots: beneath blueish or ash-coloured, beautifully varied by longitudinal brown streaks: fins and tail bright ferruginous: the whole abdomen is furnished with numerous small spines, which, when the animal is in a quiet state, are imbedded in so many corresponding cavities in the skin: but are elevated when the fish, on any alarm, distends its body. Native of the Indian seas. The Linnæan name of this fish is supposed to have been given from its tortoise-like beak, but perhaps, with more propriety, from its variegated skin.



Linnaeus.

TORTOISE-SHELL TETRADON.

1824, June 1. London, Published by G. Kearley, Fleet Street.

SPENGLER'S TETRODON.

Tetrodon Spengleri. *T. subfuscus, maculis nigricantibus, corpore cirrhato.*

Brownish Tetrodon, with blackish spots, and cirrhated body.

Tetrodon Spengleri. *T. cirris plurimis.* Bloch. t. 144.

SHAPE lengthened: colour brown above, varied with roundish deep-brown spots, largest on the sides: abdomen tumid, whitish, and thickly beset with small spines: about the upper parts of the body are dispersed several short cirrhi or soft processes: fins as in the rest of the genus. Native of the Indian seas, growing to the length of ten or twelve inches.

HONKENIAN TETRODON.

Tetrodon Honkenii. *T. fuscus albido nebulosus, maxilla inferiore longiore.*

Brown Tetrodon, with whitish clouds, and lower jaw longer than the upper.

Tetrodon Honkenii. *T. maxilla inferiore longiore.* Bloch. t. 143.

LENGTH eight or ten inches: general appearance that of *T. Spengleri*: colour brown above, with small whitish clouds or spots: beneath whitish with numerous small spines, resembling a kind of pointed tubercles: native of the Indian seas: named by Dr. Bloch from a Mr. Honkeney, by whom it was sent from India to that author.

OBLONG TETRODON.

Tetrodon Oblongus. *T. oblongus, dorso fasciis transversis fuscis.*
 Oblong-bodied Tetrodon, with the back crossed by brown bands.

T. oblongus. T. oblongus, maxillis aequalibus. Bloch. t. 146.

LENGTH six inches : shape lengthened : colour whitish, with the back grey, and marked by numerous, semi-decurrent, brown bands : fins and tail cinereous : lateral lines two, viz. one near the back, the other near the abdomen. Native of the Indian seas.

SMOOTH TETRODON.

Tetrodon Lævigatus. *T. cærulescens, subtus albidus, abdomine antice aculeato.*

Blueish Tetrodon, whitish beneath, with the abdomen aculeated in front.

Tetrodon lævigatus. *T. abdomine antice aculeato. Lin. Syst. Nat.*

A LARGE species : colour blueish above, marked on each side with two white stripes : under parts white, and from beneath the mouth to the end of the pectoral fins aculeated ; the other parts being smooth. Native of the American seas : observed about Carolina by the late Dr. Garden.

STELLATED TETRODON.

Tetrodon Stellatus. *T. sphaericus griseus, subtus albidus, corpore spinis radiatis obsito.*

Spherical grey Tetrodon, whitish beneath, with the body beset with radiated spines.

Tetrodon étoilé. *Cepede.*

LENGTH twelve or fourteen inches : shape, when inflated, nearly spherical, so as to resemble a football : colour greyish, deeper on the back, and marked with dusky specks : under parts whitish : vent surrounded by a black circle : whole body covered by very numerous small stellated or radiated spines : dorsal fin rounded at the tip, and attached at the base by a kind of footstalk : tail oval : native of the Indian seas : observed by Commerson.

PUNCTATED TETRODON.

Tetrodon Punctatus. *T. sphaericus fuscus nigro-punctatus, subtus albidus, pinna dorsali angustissima.*

Spherical brown Tetrodon with black specks, whitish abdomen, and very narrow dorsal fin.

Tetrodon pointillé. *Cepede.*

SIZE that of the stellated Tetrodon : shape, when inflated, nearly globular : upper parts brown, with numerous black specks : under parts whitish, with large irregular black spots : first ray of the pectoral fins large and black : dorsal fin extremely narrow, and hardly shewing any distinct appearance of

rays. Native of the Indian seas: observed by Commerson.

NOXIOUS TETRODON.

Tetrodon Sceleratus. *T. tetragonus, capite maximo. Lin. Syst. Nat. Gmel.*

Tetragonal Tetrodon, with very large head.

LENGTH two feet or more: native of the Indian and American seas, and considered as highly noxious, producing very severe symptoms when eaten.

OCELLATED TETRODON.

Tetrodon Ocellatus. *T. obscure viridis, subtus albidus, lunula humerali nigra maculaque dorsali flavo marginatis.*

Dull-green Tetrodon, whitish beneath, with a black crescent over the shoulders and spot on the back both edged with yellow.

Tetrodon ocellatus. *T. fascia humerali ocellata. Lin. Syst. Nat.*

Tetrodon fascia semilunari in dorso. *Bloch. t. 145.*

LENGTH six or eight inches: shape thick, ovate, contracting pretty suddenly towards the tail: mouth slightly produced: colour deep green above, gradually growing paler on the sides and abdomen, which are whitish: across the middle of the back, reaching to each pectoral fin, a broad black crescent, edged with yellow, and pointing towards the tail: dorsal fin situated on a round black spot with yellow edges: lateral line commencing from beneath

the eyes, and following the direction of the back till it reaches the tail, which is small, and slightly rounded: under parts thickly beset with small spines: native of the Indian seas, and sometimes of the adjoining rivers, particularly those of China and Japan. It is of an extremely poisonous nature, if eaten without the greatest care in properly cleaning it before dressing, and is said to have sometimes proved fatal in the short space of two hours. Kæmpfer adds that the poisonous quality is still increased by the addition of a species of *Illicium*, but the symptoms, according to Rumphius, may be cured by the timely administration of a vegetable which he calls *rex amaroris**. The Emperor of Japan prohibits his soldiers, under very severe penalties, from eating this fish: the rest of his subjects may, as Mr. Pennant observes, run the risque of being poisoned with impunity.

PINTADO TETRODON.

Tetrodon Meleagris. *T. fuscus albo-punctatus*.

Brown Tetrodon speckled with white.

Tetrodon Meleagris. *Cepede*.

COLOUR as in the specific character: skin roughened by innumerable small spines: native of the

* Linnæus says "*curatur rege amaroris*," an expression which seems to have been frequently misunderstood: *rex amaroris* is a vegetable described by Rumphius in his *Herbarium Amboinense*. In the Count de Cepede's Ichthyology I observe a singular mistake, perhaps owing to typographical negligence; viz. *rege amoris*.

Indian seas: observed by Commerson: when taken, makes a kind of grunting noise like several other fishes of this and the neighbouring genera.

ELECTRIC TETRODON.

Tetrodon Electricus. T. maculis rubris viridibus et albis, supra fuscus, subtus thalassinus, ad latera flavus, pinnis viridibus. Lin. Gmel. Paters. Act. Angl. 76. 2. p. 382. t. 13.

Tetrodon with the body brown above, yellow on the sides, sea-green beneath, and varied with red, green, and white spots.

LENGTH seven or eight inches: eyes large, with red irides: native of the Indian and American seas, inhabiting rocky places among corals: when touched affects the hand with an electric or galvanic shock.

SNOUTED TETRODON.

Tetrodon Rostratus. T. fusco-cærulescens, subtus albidus, ore elongato, abdomine antice spinoso.

Blueish-brown Tetrodon, whitish beneath, with elongated mouth, and abdomen spiny in front.

Tetrodon maxillis in rostrum elongatis. *Bloch. t. 146.*

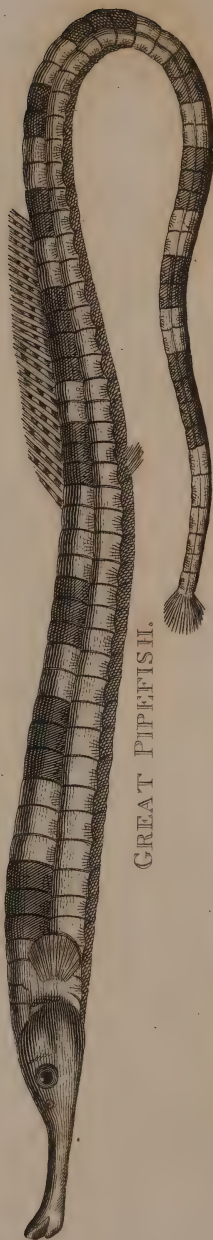
SHAPE oblong-ovate: suddenly contracting towards the mouth and tail: length a few inches: snout lengthened, so as to appear slightly tubular: colour blueish brown, whitish beneath: fore-part of the abdomen beset with spines: a few spines are also dispersed over the back: fins brown. Native of the Indian seas.



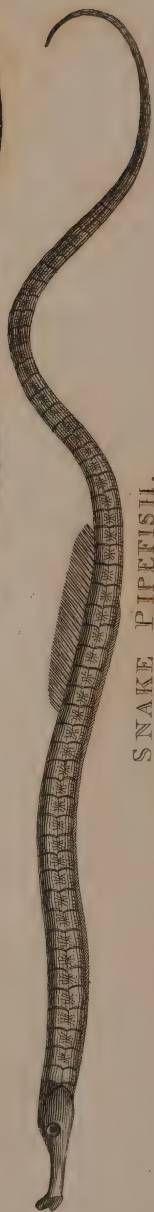
SEA-HORSE PIPEFISH.



SMALLER PIPEFISH.



GREAT PIPEFISH.



SNAKE PIPEFISH.

Hook sculp.

SYNGNATHUS. PIPEFISH.

Generic Character.

<i>Rostrum</i> subcylindricum, ore terminali.	<i>Snout</i> subcylindric, with terminal mouth.
<i>Corpus</i> elongatum, articula- tum, cataphractum.	<i>Body</i> lengthened, jointed, mailed.
<i>Pinnæ ventrales</i> nullæ.	<i>Ventral fins</i> none.

GREAT PIPEFISH.

Syngnathus Acus. S. heptagonus albidus fusco fasciatus, cauda pinnata.

Heptagonal whitish Pipefish, with brown bands and pinnated tail.

Syngnathus Acus. S. pinnis caudæ ani pectoralibusque radiatis, corpore septemangulato. Lin. Syst. Nat.

Syngnathus corpore heptagono, cauda pinnata. Bloch. t. 91.

THE fishes of the present genus are inhabitants of the sea, and are observed to frequent the shallower parts near the shore, feeding on the smaller worms and insects: they are easily distinguished by their slender habit, and angular, jointed body. The *Syngnathus Acus* or Great Pipefish is usually seen of the length of twelve or fifteen inches, but is sometimes found, especially in the northern seas, of far greater extent, measuring from two to three feet: it is of an extremely slender form, gradually tapering towards the extremity, and is of a pale yellowish

brown colour, varied throughout its whole length with broad alternate zones of a deeper or olive-brown, with a few smaller variegations intermixed: the shields or laminae with which the joints of the body are covered, appear, if narrowly inspected, to be finely radiated from the centre by numerous lines or streaks: the dorsal fin is placed rather nearer the head than the tail, and is thin, tender, shallow, and of no great extent: the pectoral fins small, and slightly rounded, and the tail of similar shape and size. In spring, as in others of this genus, the ova are found lying in a longitudinal channel or division at the lower part of the abdomen, and are large in proportion to the size of the animal: from these are hatched the young, completely formed. Native of the European seas.

SMALLER PIPEFISH.

Syngnathus Typhle. *S. hexagonus, cauda pinnata.*

Hexagonal Pipefish, with pinnated tail.

Syngnathus Typhle. *S. pinnis caudæ ani pectoralibusque radiatis, corpore sexangulato. Lin. Syst. Nat.*

Syngnathus corpore hexagono anoque pinnato. *Bloch. t. 91. f. 1.*

THIS is by some considered as a variety of the preceding fish, from which it chiefly differs in being of smaller size, seldom measuring more than a foot or fifteen inches, and in having the body rather hexagonal than heptagonal. It is chiefly found in the Northern seas.

SNAKE PIPEFISH.

Syngnathus Ophidion. *S. corpore subtereti, cauda aptera.*

Pipefish with roundish body, and finless tail.

Syngnathus Ophidion. *S. pinnis caudæ ani pectoralibusque nullis, corpore tereti.* *Lín. Syst. Nat.*

Syngnathus corpore tereti. *Bloch. t. 91. f. 3.*

THIS differs from both the preceding in having the body nearly round, or at least so obscurely cornered as to appear round on a cursory view: it is also entirely destitute of a tail-fin, the body terminating in a naked point: it grows to the length of two feet, and is chiefly found in the Northern and Baltic seas.

BIACULEATED PIPEFISH.

Syngnathus Biaculeatus. *S. ferrugineus, corpore tetragono, capite supra biaculeato.*

Ferruginous Pipefish, with quadrangular body, and two spines above the head.

Syngnathus biaculeatus. *S. corpore quadrangulato, aculeis duobus ad caput.* *Bloch. t. 121.*

LENGTH six or eight inches: body somewhat broader in proportion to its length than in the preceding kinds: dorsal fin placed low on the back: tail hexagonal at its origin, gradually becoming tetragonal in its progress, and terminating in a finless point or tip: colour of the whole animal rufous brown. Native of the Indian seas, and also said to be found in the Baltic.

PELAGIC PIPEFISH.

Syngnathus Pelagicus. *S. ferrugineus, fasciis angustis fuscis, corpore heptagono.*

Ferruginous Pipefish, with narrow brown bands, and heptagonal body.

Syngnathus pelagicus. *S. pinnis pectoralibus caudæque radiatis, ani nulla, corpore septemangulato. Lin. Syst. Nat.*

Syngnathus corpore heptagono, lineis transversis brunneis. *Bloch. t. 109.*

GENERAL appearance similar to that of the Smaller Pipefish: length about a foot, or more: colour yellow-brown, variegated with narrow, transverse, deep-brown bars placed at intervals along the body: tail-fin small and slightly rounded. Native of the Indian and African seas.

 ÆQUOREAL PIPEFISH.

Syngnathus Æquoreus. *S. pinna caudæ radiata, pectoralibusque anique nullis, corpore angulato. Lin. Syst. Nat.*

Pipefish with rayed tail-fin, and angular body, without pectoral or anal fins.

INHABITS, according to Linnæus, the European seas.

BARBARIC PIPEFISH.

Syngnathus Barbarus. *S. pinnis caudæ anique nullis, corpore sexangulato. Lin. Syst. Nat.*

Pipefish with hexagonal body, without caudal or anal fins.

NATIVE of the European seas.

 SEA-HORSE PIPEFISH.

Syngnathus Hippocampus. *S. capite crasso, corpore subhexagono tuberculato, cauda quadrangula aptera.*

Pipefish with thick head, subhexagonal tuberculated body, and quadrangular finless tail.

Syngnathus Hippocampus. *S. pinna caudæ quadrangulæ nulla, corpore septemangulato tuberculato. Lin. Syst. Nat.*

Syngnathus corpore tuberculoso. *Bloch. t. 109.*

Hippocampus. *Rond. Gesn. Aldr. Will. &c.*

A FISH of a highly singular appearance: general length from six to ten inches: body much compressed; colour greenish brown, varied with darker and lighter specks: head large, thickish, and beset on the upper part, as well as along some of the first joints of the body, with several small, weak, lengthened spines or cirrhi, which are sometimes slightly ramified: snout slender: neck contracting suddenly beyond the head: body rather short, and contracting suddenly towards the tail, which is long, quadrangular, and terminates in a naked or finless tip. In its dry or contracted state this animal exhibits the fancied resemblance from which it takes its name, but in the living fish this appearance is

somewhat less striking, the head and tail being carried nearly strait. It is a native of the Mediterranean, Northern, and Atlantic seas.

FOLIATED PIPEFISH.

*Syngnathus Foliatu*s. *S. olivaceo-nigricans*, *albido-punctatus*,
appendicibus foliaceis.

Blackish-olive Pipefish, with white specks, and leaf-shaped appendages.

A most extraordinary species; far exceeding all the rest of the genus in the singularity of its appearance, which is such as at first view rather to suggest the idea of some production of fancy than of any real existence. In its general shape it is greatly allied to the preceding species, but is considerably longer in proportion, or of a more slender habit: its great particularity however consists in the large leaf-shaped appendages with which the back, tail, and abdomen, are furnished: these appendages are situated on very strong, rough, square spines or processes, and were it not for the perfect regularity of their respective proportions, might be mistaken for the leaves of some kind of fucus adhering to the spines. The colour of the whole animal is a dusky or blackish olive*, thickly sprinkled on all parts, except on the appendages, with small round whitish specks, and accompanied by a kind of metallic gloss on the abdomen: the fins are soft,

* Perhaps greener in the living animal.

FOLIATED PIPE-FISH.

2804, June 1. London, Published by G. Knapp, Fleet Street.



Harsh engr.

tender, and transparent. This curious species is a native of the Indian seas. The specimen represented in its natural size on the annexed plate was taken near the coasts of New Holland, and was sent, together with a second of exactly similar appearance, but of rather smaller size, to the Right Honourable Sir Joseph Banks, Baronet, President of the Royal Society, through whose polite permission it was engraved for the present work. Nothing particular seems to be known relative to its habits or natural history.

CENTRISCUS. CENTRISCUS.

Generic Character.

<i>Rostrum</i> elongatum.	<i>Snout</i> lengthened.
<i>Corpus</i> compressum, abdomine carinato.	<i>Body</i> compressed, carinated beneath.
<i>Pinnæ ventrales</i> unitæ.	<i>Ventral fins</i> united.

MAILED CENTRISCUS.

Centriscus Scutatus. *C. loricatus lævis aureo-ferrugineus.*

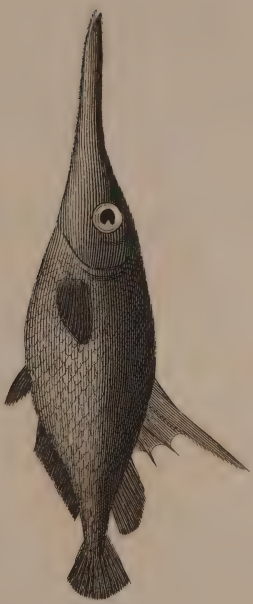
Smooth, mailed Centriscus, of a golden-ferruginous colour.

Centriscus scutatus. *C. dorso loricato lævi.* *Lin. Syst. Nat.*

Centriscus scutatus. *Bloch. t. 123.*

THE Centriscus scutatus is a fish of a remarkable aspect, having the body so much compressed as to resemble a mere lamina, particularly on the lower part, where it is membranaceous: the whole upper part of the body is formed into a kind of mail, divided into several broad segments, to the number of twelve on each side; and terminates in a projecting point at the end of the back, dilating into a small shallow fin beneath: the head is oblong, and terminates in a lengthened, tubular snout: the pectoral fins are situated at a considerable distance from the branchial orifices, and the hind part of the

SNIFE CENTRISCUS.



MAILED CENTRISCUS.



Head, n. p.

body is terminated, beneath the mailed coating, by three fins or processes, the middle of which is rather longer than the others, being seated on a kind of lengthened base: the back is of a fine dark-ferruginous brown colour, accompanied by a gilded tinge; the sides are yellowish, with a cast of silver, and the abdomen reddish, the divisions of the shield being marked by so many transverse white lines: the whole fish is semitransparent, and appears as if inclosed in a sheath or case of the finest tortoiseshell. It arrives at the length of six or eight inches, and is a native of the Indian seas, where it is supposed to live on the smaller kinds of marine insects, worms, &c.

SNIFE CENTRISCUS.

Centriscus Scolopax. *C. ferrugineus squamosus.*

Ferruginous scaly Centriscus.

Centriscus Scolopax. *C. corpore squamoso scabro, cauda recta extensa.* *Lin. Syst. Nat.*

Centriscus squamosus. *Bloch. t. 123.*

Balistes Scolopax. *Artedi.*

LENGTH from four to six or eight inches: shape long-oval; snout greatly lengthened: body covered with numerous, small, pointed-scales: colour rufous-brown above, paler beneath, with a slight silvery cast on the sides: dorsal fin subtriangular, and furnished with a very thick and strongly serrated spine: second smaller, and slightly rounded: pectoral and ventral fins rather small: anal shallow:

tail small and slightly rounded. Native of the Mediterranean and Indian seas : numbered among edible fishes, but from its size and thinness esteemed of no great importance.

LIGHT-ARMED CENTRISCUS.

Centriscus Velitaris. *C. semiscutatus argenteus, spina dorsali subrecumbente.*

Half-shielded silvery Centriscus, with subrecumbent dorsal spine.

Centriscus velitaris. *C. corpore ex oblongo lanceolato, setulis recumbentibus ad nates hispido. Lin. Syst. Nat. Gmel. Pall. spic. zool. 8. p. 36.*

LENGTH about two inches : colour silvery, with yellowish-grey back : abdomen formed into a triangular keel before the ventral fins : back mailed by a rhombic shield, marked by four oblique lines : in the middle a strong, recumbent, somewhat moveable, and very sharp, serrated spine, beneath which is a second : vent-fin broad : tail slightly rounded. Native of the Indian seas.

SWIMMING PEGASUS.

*Heath sculp.*

DRAGON PEGASUS.

PEGASUS. PEGASUS.

Generic Character.

<i>Rostrum</i> elongatum. <i>Os</i>	<i>Snout</i> elongated: <i>mouth</i> beneath.
sub rostro.	
<i>Pinnæ pectorales</i> amplæ:	<i>Pectoral fins</i> large: <i>ventral</i>
<i>ventrales</i> uniradiatæ.	single-rayed.
<i>Corpus</i> depressum, cata-	<i>Body</i> depressed, mailed,
phractum, abdomine os-	with the abdomen divided
seis incisuris articulatam.	into bony segments.

DRAGON PEGASUS.

Pegasus Draco. P. thorace subtetragono, humeris prominentibus, abdomine brevi.

Pegasus with subtetragonal thorax, prominent shoulders, and short abdomen.

Pegasus Draconis. P. rostro conico. Lin. Syst. Nat.

Cataphractus corpore tetragono, brevi, scabro. Gronov. zooph.

Pegasus corpore lato tetragonoque. Bloch. t. 209.

THE genus *Pegasus* is in some degree allied to that of *Syngnathus*. The principal species, the *Pegasus Draco*, is a small fish of about the length of three or four inches, and is remarkable for the size of its pectoral fins, which are supposed to enable it, like the *Exocoeti* and some other fishes, to support itself for some moments in air, while it springs occasionally over the surface of the water: the thorax or superior part of the body is of a

broad, slightly flattened, squarish form, and is marked both above and beneath by several radiated shields or bony tubercles of considerable size: from each side the abdomen springs a lengthened cirrus, which may be considered as supplying the place of a ventral fin: from the thorax the body decreases suddenly in diameter, and is marked into several divisions or transverse segments: the tail is small and slightly rounded: the pectoral fins, as before observed, are large in proportion to the size of the animal, and of a rounded shape, with a kind of scalloped or indented outline: the eyes are large and protuberant, and the snout of a subconical form, but with a slight dilatation towards the tip, so as to appear spatule-shaped when viewed from above: the colour of the whole animal is whitish, with a slight cast of pale-brown. It is a native of the Indian seas.

FLYING PEGASUS.

Pegasus Volans. *P. rostro ensiformi denticulato.* Lin. Syst. Nat.

Pegasus with ensiform denticulated snout.

LENGTH about three inches: snout much elongated, flattened, rounded, and slightly dilated at the tip; marked by a longitudinal channel, and crenated or denticulated on the edges: on the head a rhomboidal depression, and behind it two deep sub-pentagonal cavities: last joints of the body, next the tail, pointed on each side. Native of the Indian seas.

SWIMMING PEGASUS.

Pegasus Natans. *P. thorace abdomineque elongatis.*

Pegasus with lengthened thorax and abdomen.

Pegasus natans. *P. rostro ensiformi inermi.* *Lin, Syst. Nat.*

Pegasus corpore oblongo tetragonoque. *Bloch. t. 121.*

LENGTH three or four inches: shape much more slender than that of the *P. volans*: colour yellowish brown, whitish beneath: snout slender, slightly dilated and rounded at the tip, and marked both above and beneath by a middle furrow: pectoral fins rounded and of moderate size: dorsal situated on the middle of the back: segments of the abdomen about eleven or twelve in number: tail small and slightly rounded: ventral cirri slender and flexible. Native of the Indian seas.

END OF VOLUME V.

Printed by THOMAS DAVISON, White-Friars.

